Conditions for the management of carrying capacity in the parks of Parks&Benefits

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Conditions for the management of carrying capacity in the parks of Parks&Benefits

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Summary

Growth in the number of visitors is an upcoming problem in nature parks. Nature parks are at the same time facing increasing demand, falling public appropriations and receding focus on their conservation functions. To ensure a balancing of nature protection and economic utilization the concept of carrying capacity has received increasing attention among park-authorities all over the world. Carrying capacities understood as limits or standards not to be exceeded to protect a supporting landscape system are not scientifically determined sizes. They are a result of political decision processes among stakeholders, balancing use and protection preferably based on scientific and/or experiential cognition. The conditions for the management of carrying capacity for the 8 nature parks in the EC Baltic Project Parks&Benefits are analysed in the report.

1. Part focus on the methodology, concentrated on the comparison of the common conditions related to the international nature protection obligations in the parks, primarily expressed through the management under the EU Natura2000-program.

In part 2, a comparison of the 8 parks concerning extent, land use composition, population in and around the park, visitorestimates, and information on the related Natura2000 sites are presented, together with a comparative summary of carrying capacity problems, being dealt with in the 8 parks.

In part 3 a comparable description of the land cover conditions, the conservational goals and carrying capacity problems of the parks are presented in detail.

Foreword

This is a preliminary report on the conditions for the management of carrying capacity in the parks of Parks&Benefits. Without doubt it is full of errors and mistakes due to the quantitative character of the comparison of the parks that is the main principle behind the study. We ask all the partners for critical comments for a revision.

In the last part of the report we have tried in a comparable way to sum up some challenges and initiatives related to the carrying capacity of visitors, based on comparable statistics on the parks and the presentations from the park authorities during the meeting in Matsalu in October 2010.

Three workspaces should be emphasized for the further improvement of the management of carrying capacity:

1. We need more examples of local carrying capacity-conflicts and related standards for the protection of nature resources and visitor experience - standards to be proposed for the necessary regulation of visitor flow and behavior. The relation to the Natura2000 system of protected habitats and species as a common European objective has been emphasized in the report for comparison, but many other objectives at different geographical levels are relevant. Such objectives/desired conditions will be important both for the political decision process related to the carrying capacity, and for the future management system.

2. We need basic information on visitor monitoring and associated indicators that can be attached to proposed (and hopefully later politically decided) standards. The most concrete need could be to find means to fill in the fields of Table 2.2 on estimation of visitor flow and overnight stay capacity. This could be a start, also being relevant for the comparison of the tourism and recreation potentials of the parks and their pressure on the nature resources.

3. The comparison of the regional conditions for the parks and the role of the parks in the improvement of the regional nature and recreation potentials, as well as for the improvement of the broader environmental and landscape conditions in the surrounding region is a main task that has not been addressed in this report. We hope to add some on this later in the spring 2011. Where Natura2000 and the European Charter on sustainable Tourism seems to be of obvious relevance within the parks, the ‘carrying capacity’ or sustainability aspects of the related regional development might additionally be related to broader perspectives such as the European Landscape Convention.

In this preliminary report no final recommendations have been raised. But it is the intention to develop such recommendation within the last part of the Parks&Benefits project.

1. Methodology

1.1. How to understand Carrying Capacity

Carrying capacities understood as limits or standards not to be exceeded to protect a supporting landscape system are not scientifically determined sizes. They are a result of political decision processes among stakeholders, balancing use and protection preferably based on scientific and/or experiential cognition (Garthe, 2005). Such types of carrying capacities are not a new invention related to the modern ecological crisis, quite the opposite. It has been known in all stable traditional land use systems and was a central concept in the regulation of the widespread agricultural infield-outfield systems all over Europe in Medieval time. Here carrying capacity has often been seen as an ecological optimization concept related to the production potential, estimated for taxation purposes (Brandt, 1992). The most extensively used areas of the former outfields, on which the carrying capacityconcept was especially widespread ad mean for regulation of the grazing at the commons, often comprise today's nature conservation areas. At the same time many historical studies also shows that even if such carrying capacity principles for an ecological balanced use of the landscapes have been widely used and explicitly formulated and treated in a democratic process among stakeholders they did only work, if the overall goal, namely to ensure the longsighted sustainable use of the landscape, was commonly accepted among the stakeholders (Brandt, 2010). If this was not the case, if the longsighted protection of the system as the main interrelation between man and nature, was neglected in favour of narrow shortterm economy or power related considerations, it was not possible to ensure a sustainable land use based on principles of carrying capacity: 'Mediation among stakeholders is irrelevant if it is based on ignorance of the integrated character of nature and people' (Gunderson and Holling 2002:8). This is the main reason why general models for sustainability are so difficult to develop: Not only are the variation in interests among stakeholders considerable and the knowledge of eventual impacts limited, a general acceptance of ecological necessities forming a foundation for a common management of carrying capacities, are seldom realized, although ideologies, concepts and buzzwords on sustainability often are used noncommittal at the political level.
However, a nature park as a landscape area designated to fulfill protection purposes by authorities, strongly interested in respecting these goals in the cooperation among the relevant stakeholders, might fulfill the conditions of using carrying capacity as a management instrument, provided that the stakeholders respects the goals too, or that the authorities have means and will to ensure that these goals will be respected among the stakeholders.

The growing interest in and pressure on nature parks has promoted experiments, theory and a growing literature on management of carrying capacity for visitors. Different general methods seems to develop, especially in the USA, where the recreation visits to the U.S. national park system has grown from less than 40 million after the Second World War to almost 300 million,

producing serious problems both for the protection of the nature resources and for the nature experience delivered by the parks.

A clear result from these studies is that carrying capacity cannot be seen as a one-dimensional instrument. A main problem in the endeavor to cope with the problems has proved to be better integration of the resource dimension, the experiential dimension and the managerial dimension of the carrying capacity that are often handled separately due to scientific and managerial specialisation. The integration is often expressed in a methodological sequence of decisions/actions (such as the Visitor Experience and Ressource Protection (VERP) method), starting with the establishment of management objectives/desired conditions and associated indicators and standards, connected to the establishment of a stable monitoring system monitoring a collection of indicator variables, and finally to apply management practices to ensure that standards for the monitoring indicators are maintained (Manning, 2007, 2010).

There is an important geographical scale problem in such carrying capacity-studies and management practices. An overall carrying capacity of visitors can very seldom (probably never) be attached to a whole park (although it might be relevant), but should be initiated and handled at a local level of hot spots or conflict zones, where the concrete man-nature and man-man conflicts can be studied and related to the spatial distribution of nature resources, visitors and accessibility foreclosure and capacity of points and lines in the landscape. In the last part of this report some examples from the different parks of such studies and practices are presented as an inspiration for further carrying capacity studies.
If the nature park additionally to the protection of habitats and species has to fulfill other goals, such as recreational purposes or promotion of the regional economy through tourism or settlement, the respect for the 'integrated character of nature and people' as a precondition for the sustainable use, will be even more important for the successful use of the carrying capacity concept. In this case the protection goal might shortsighted be competing with other goals (such as income or employment) if an integrated longsighted goal of sustainability is not generally accepted. Still, however, the carrying capacity concept might be useful, if the nature protection goals are strongly and explicitly formulated and socially accepted.

1.2. Natura2000 as a common condition for Carrying Capacity-considerations

Some of the strongest nature protection obligations for the nature parks within Parks&Benefits are those related to the Nature2000 designations of the European Union, since a strict and obligatory procedure for their contribution to EUs commitments on the protection of biodiversity has been formulated and are under implementation. The nature protection of Natura2000 designations comprises any threat against their nature habitats and related species, not only within, but also from outside the Natura2000 designations.

Additionally the EU Natura2000-statistics allow for a comparison of an important part of the nature protection in the parks, and of the impacts registered. A comparative analysis of problems of carrying capacity related to the recreational use of the parks within Parks&Benefits should paralleled consider man-man conflicts and risks to the nature protection goals related to the park, by a growing visitor intensity. A comparable presentation of the nature protection goals at a European level is an important point of departure because it both presents primary attraction points of the parks and at the same time gives information on their fragility to different types of conditions and impacts. This information exists in a comparable way on a rather detailed level for parts of the landscapes in and around 7 of the 8 parks through the Natura2000-statistics being delivered to the European Environmental Agency (EEA) (http://www.eea.europa.eu/data-and-maps/data/natura-2000). Comparable information on the last park area, Dovrefjell in Norway might be added, where possible. For 6 of the parks, one or up to several Natura2000-sites covers the majority of the park area, in one case, a number of small Natura2000-areas are included in the park.

1.3. Natura2000 statistics on habitats and species

There are two types of Natura2000-designations: Special Areas of Conservation (SACs – Habitat sites[1]) and Special Protection Areas (SPAs-Bird protection sites). Within all Natura2000 sites general land cover statistics are collected based on a classification of land cover comprising 23 different so-called broad habitat types. This allows for a comparison of the main habitat composition in the Natura2000 sites related to the nature parks. This statistics is however not comparable with the land use oriented CORINE land cover statistics used for comparison of land use within the 8 nature parks (see Table 2.1 and Figure 2.2 and 2.3).

Within the habitat sites (SACs or SCIs), specific areas of natural habitats according to a European list of 231 natural habitat types (for an overview, see http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/2007_07_im.pdf) have additionally been delineated and ranked according to their representatively, relative surface (their share of the habitat type area in a national context), conservation status, and a global assessment. Within the 231 European natural habitat types, 71 habitat types are in danger of disappearance and whose natural range mainly falls within the territory of the European Union have been listed with priority. These are called ‘priority habitats’.

The EU statistics on Natura2000 relates to the delineation of Natura2000 sites, not the parks. Therefore the total area of Natura2000-sites totally or partly overlapping the park area has been used as spatial reference for Natura2000-statistics related to the parks. For the statistics on habitat sites (SACs and SCIs) and on listed habitat types (including priority habitat types) only the habitat sites overlapping the parks are relevant. This has been the spatial reference for Figure 4.2 and Table 2.4 and 2.5, whereas the total Natura2000 sites (including Bird sites) overlapping the parks have

[1] Before Habitat Sites are recognized as SACs, they are (up to 6 years) called Sites of Community Importance (SCI).

been the reference for Table 2.6 and 2.7 and Figure 2.5. For the detailed figures on the conservational characteristics of listed habitat types and species in the single park (Fig. 3.1-3.7) the overlapping habitat sites have been the reference for the habitat data, whereas the total natura2000 sites have been the reference for the species data.

Within both the habitat and the bird protection areas information on protected species according to European lists have been collected and ranked, too, according to their population (share of the population in a national context), conservation statues, isolation and a global assessment.

For these properties the following ranking system has been used:
A: Excellent representativity/excellent conservation /estimated to between 15 and 100 % of the national area or number/population (almost) isolated/excellent value
B: Good representativity/good conservation /estimated to between 2 and 15% of the national area or number/good value
C: Significant representativity/average or reduced conservation /estimated to between 0 and 2% of the national area or number/significant value
D: Non-significant presence (only for the representativity of habitats)

For further details on the ranking of listed habitat types and species in the Natura2000-statistics, see http://ec.europa.eu/environment/nature/legislation/habitatsdirective/docs/standarddataforms/notes_en.pdf

1.4. Natura2000 statistics on threats against biodiversity values

Present threats against biodiversity values, also through recreation and tourism is also to be found in the EEA Natura2000-data, but at a rather general level that has been included in the comparable description of conditions and carrying capacity-problems in each park (Chapter 3). For further information on the qualitative data within the relevant Natura2000 sites collected by the EEA, the European Topic Centre on Biological Diversity (Eionet) has been contacted, but up to now no response has been received. A more close analysis of carrying capacity conflicts has in most cases to be adapted to a more detailed spatial analysis of the relation between the location of listed habitat types and species, and the location and movement of visitors. Maps of the exact location of the ingoing listed Natura2000-habitat-types exists at a national level and might be relevant for the park administration as a tool by the localization of conflicts zones, where existing or upcoming carrying capacity problems related to the visitor flow and the protection interests requires attention from a management point of view.

Examples of existing carrying capacity related activities in the 8 parks are presented based on the presentations given at the Park&Benefits meeting in Haapsalu, October 2010. Emphasis is put on concrete local conflicts, management solutions and related monitoring and negotiations of standards to be used by the management of conflicts.

1.5. Future additions to a comparison of carrying capacity-problems in the parks

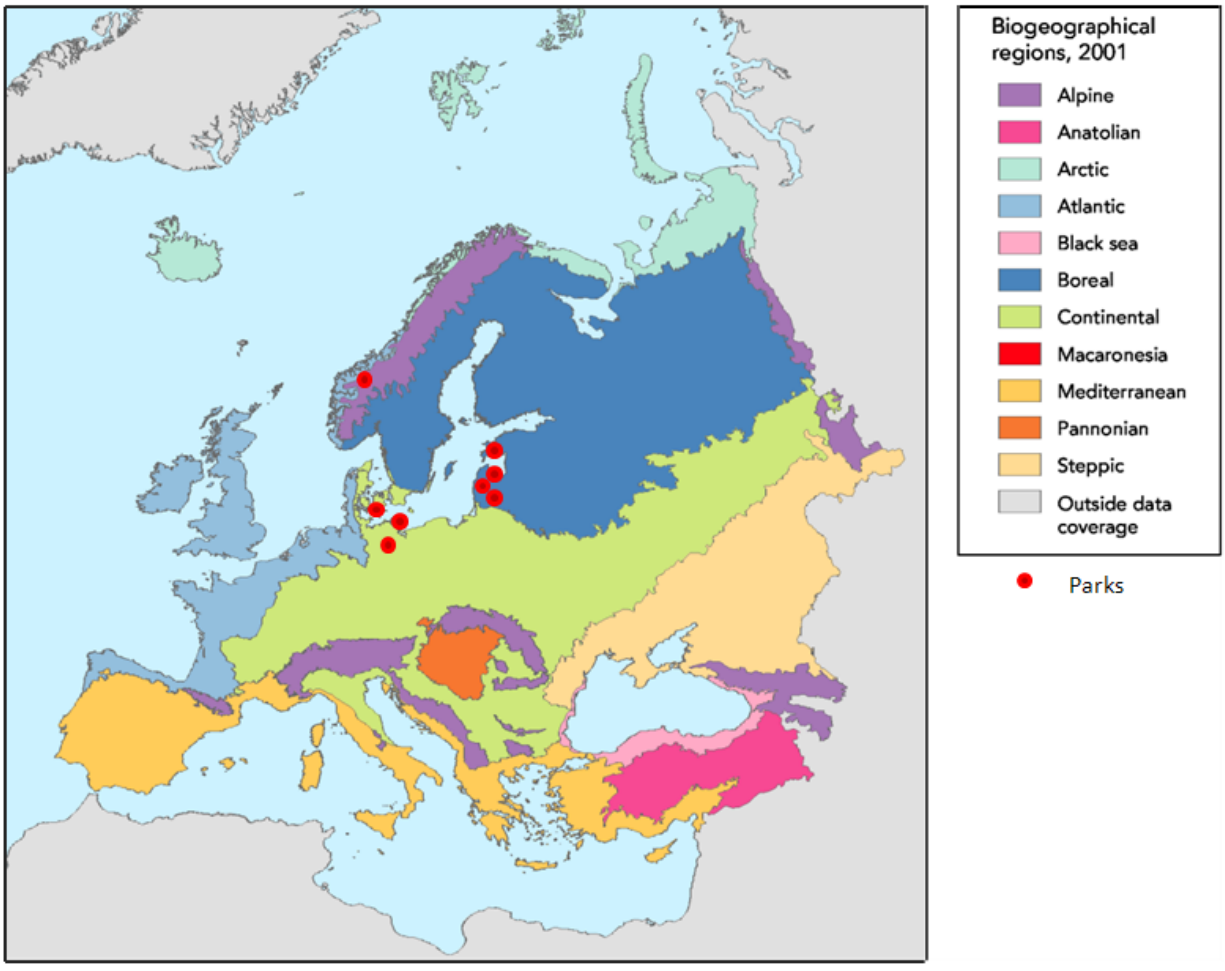
If possible, upcoming development of threats related to future trends in visitor pressure (based on market investigations) should preferably not only be stated in general, but the expected and/or planned spatial distribution of an increased visitor flow should be treated as well. Some questions and goals concerning conflicts to be elaborated on/negotiated in the coming time, with emphasis on monitoring of visitor flows, development of indicators and negotiation of standards and related management capacity and cooperation, should preferably be formulated in the end to sum up the future park agenda concerning carrying capacity. This can also form a basis for the general conclusions and recommendations concerning carrying capacity.

2. A comparative overview

2.1. Size and biogeographical distribution of the 8 parks

The 8 parks collaborating within the project Parks&Benefits reflects the diverse environmental conditions that exist around the Baltic Sea, uniting the northeastern part of Europe.
Nature protection in the European Union is organized within 7 biogeographical regions, each with its own characteristic blend of vegetation, climate and geology.

Map 2.1: Map of bio-geographical regions in Europe



Source: European Environmental Agency (EEA): Biogeographical regions, Europe 2001. http://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-europe-2001. A new version from 2009 exists, but has not been used, since all data outsite EU has been removed. Within EU there are no changes of relevance for this study.

The 8 parks represents important examples of the diversity of habitats and species within 3 of these biogeographical regions: 3 of the parks are located in The Continental Region (Maribo Lake Nature Park (DK), Biosphere Reserve NE Rügen (D) and Müritz National Park (D)), 4 in The Boreal Region (Matsalu National Park (EE), Kemeri National Park (LV), Zemaitijos National Park (LT) and Kurtuvenai Regional Park (LT)), and 1 park in the Alpine Region (Dovrefjell National Park (N)). For further details on the biogeographical regions of Europe as a frame for conservation, see http://ec.europa.eu/environment/nature/natura2000/sites_hab/biogeog_regions/index_en.htm

The parks are not only distributed over an enormous area, they are also very different in size, thus reflecting very different scales of nature protection levels. So the 1.700 km^2 Dovrefjell National Park in Norway is of the same size as the total area of all the other 7 parks together[2]. With an area of only 47 km^2, including 12 km^2 of lake, Maribo Lakes Nature Park is the smallest, only ¼ of the second smallest, being the 188 km^2 Kurtuvenai Regional Park.

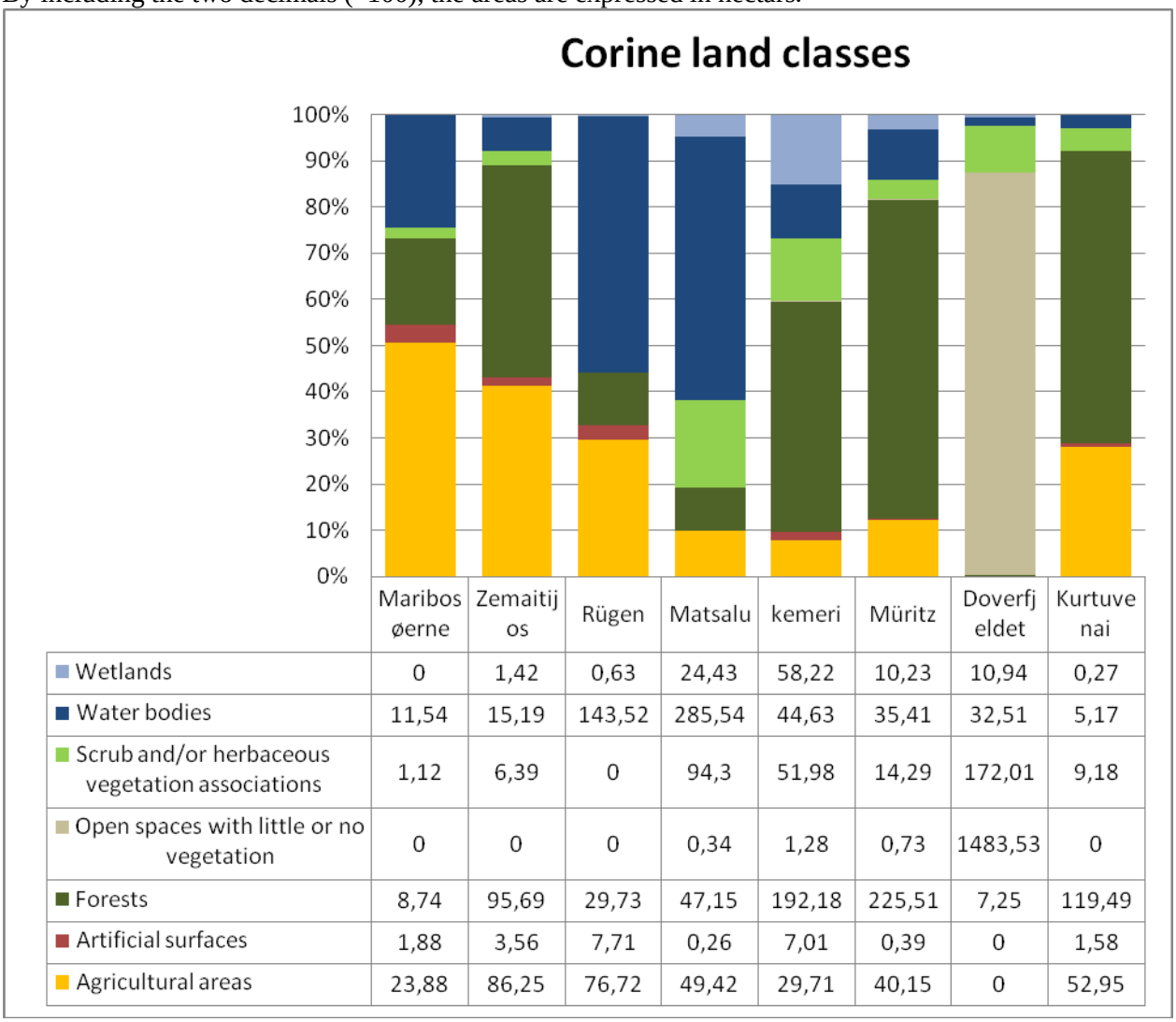
2.2. Land use of the nature parks

A comparison at a European level of the land use in the parks can be made from the CORINE land cover classification. A legend for the CORINE land cover classification at level two with 44 different land classes are given in Appendix A. This legend is used for the maps in Figure 3.1-3.7. For the overview in Table 2.1 and Figure 2.1 is used a simplified version, consisting of only level 1 in Appendix A, except for class 3: Forest and semi-natural areas, where the level two classes have been used.

The land use composition of the parks differs considerable; see Table 2.1 and Figure 2.1. Agricultural land plays an important role in most of the parks, covering 8-51 % of the area in 7 of the 8 parks. Also forests covers large areas in these 7 parks, with a minimum of 9 % in Matsalu National Park. Dovrefjell National Park obviously forms an exception, with 87% of the surface taken up by open spaces with little or no vegetation and additional 10% taken up by shrub and/or herbaceous vegetation associations.

[2] Dovrefjell-Sunndalsfjella National Park even additionally comprises 7 landscape and 2 biotope protected areas (4.365 km^2) + buffer zones included in a County plan forming an area of 6.300 km^2 within which the regional aspects of monitoring and carrying capacity studies of Dovrefjell-Sunndalsfjella National Park are carried out.

Figure 2.1: CORINE land classes in the 8 nature parks of Parks&Benefits. All figures in the table are in km^2. By including the two decimals (*100), the areas are expressed in hectars.



	Maribos øerne	Zemaitijos	Rügen	Matsalu	kemeri	Müritz	Doverfjeldet	Kurtuvenai
Wetlands	0	1,42	0,63	24,43	58,22	10,23	10,94	0,27
Water bodies	11,54	15,19	143,52	285,54	44,63	35,41	32,51	5,17
Scrub and/or herbaceous vegetation associations	1,12	6,39	0	94,3	51,98	14,29	172,01	9,18
Open spaces with little or no vegetation	0	0	0	0,34	1,28	0,73	1483,53	0
Forests	8,74	95,69	29,73	47,15	192,18	225,51	7,25	119,49
Artificial surfaces	1,88	3,56	7,71	0,26	7,01	0,39	0	1,58
Agricultural areas	23,88	86,25	76,72	49,42	29,71	40,15	0	52,95

Source: EU CORINE Land Cover Database. Deliniation of the parks by Roskilde University.

The vast majority of Dovrefjell National park (and due to that even half of the total land surface of the 8 parks) is covered by bare land, without herbaceous vegetation, only taking up very small areas (less than 0.3%) in the other parks. In all parks, water bodies are important and take up a considerable part of the area, with Kurtuvenai showing the minimum of 3% water bodies. In addition, vast marine environments are important in 2 of the parks, Rügen and Matsalu. To allow for a comparison of the land surface of the 8 parks, this is indicated separately in a row of Table 2.1.

In most of the parks, artificial surface in form of build up areas and infrastructure takes up some minor part of the area, the only exception being Dovrefjell National Park, Matsalu National park and Müritz National Park with almost no artificial surface. For Müritz and Dovrefjell, this is mainly due to the delineation of the park area, where all settlement areas have been excluded from the

national park territory. Wetlands constitute important parts of the conserved habitats in most of the parks, covering however only small areas, most in Dovrefjell, Kemeri, Müritz and Matsalu.

Table 2.1: Size and land use of the 8 parks of Parks&Benefits.

	Dovre-fjell	Kemeri	SE-Rügen	Kurtu-venei	Maribo søerne	Matsalu	Müritz	Zemaitija
Size of the Park (in km^2)	1.706	385	258	189	47	501	327	209
Land area of the park (Park area minus water bodies and marine areas in the park), in km^2	1.663	340	115	183	36	216	291	193
Artificial surface (in km^2 and % of park area)	0 (0%)	7 (2%)	8 (3%)	2 (0.8%)	2 (4%)	0 (0.1%)	0 (0.1%)	4 (2%)
Agricultural areas (in km^2 and % of park area)	0 (0%)	30 (8%)	77 (30%)	53 (28%)	24 (51%)	49 (10%)	40 (12%)	86 (41%)
Forest and seminatural areas (in km^2 and % of park area)	7 (0.4%)	192 (50%)	30 (12%)	119 (63%)	9 (19%)	47 (9%)	226 (69%)	96 (46%)
Shrub and/or herbaceous vegetation associations (in km^2 and % of park area)	172 (10%)	52 (14%)	0 (0%)	9 (5%)	1 (2%)	94 (19%)	14 (4%)	6 (3%)
Open spaces with little or no vegetation (in km^2 and % of park area)	1.484 (87%)	1 (0,3%)	0 (0%)	0 (0%)	0 (0%)	0.3 (0,1%)	0,7 (0,2%)	0 (0%)
Wetlands (in km^2 and % of park area)	11 (0.6%)	58 (15%)	1 (0,2%)	0 (0,1%)	0 (0%)	24 (5%)	10 (3%)	1 (0,7%)
Water bodies (in km^2 and % of park area)	33 (2%)	45 (12%)	144 (56%)	5 (3%)	12 (25%)	286 (57%)	35 (9%)	15 (7%)

Source: EU CORINE Land Cover Database.

2.3. Population and visitors in and around the nature parks

Also the general pressure from the human activities of the local and regional population is very different from park to park (see Table 2.2). Whereas only one park (Biosphere NE-Rügen) has a population of more than 10.000 inhabitants within the borders of the park, the population within a distance of 50 km from the park comprises from 106.000 (Matsalu National Park) to 1.142.000 (Kemeri National park in the vicinity of the Latvian capital Riga). The economic activities of this regional population certainly strain the park area and the related nature resources, especially through pollution from agriculture, forestry, industry, transport etc., however only in a limited degree since most of these activities are located at a certain distance from the park. The regional population forms additionally an important part of the market for the recreational and settlement attractions, set up by the park, playing a basic role for the park in the strategy to ensure a stable economy and local and regional political backing.

Table 2.1: Population within and around the 8 nature parks and estimations of visitors and overnight stay capacity.

	Dovre-fjell	Kemeri	SE-Rügen	Kurtu-venei	Maribo søerne	Matsalu	Müritz	Zemaitija
Population within the park, in 1000[1)]	No data	7	12	3	2	1	2	6
Population within 50 km from the park, in 1000[1)]	No data	1142	395	456	191	106	676	484
Estimated number of day tourists per year (in 1000)								
Estimated number of overnight tourists (guest-arrivals) per year (in 1000)			1.300					
Estimated number of visitors per year (in 1000)	30?				20?			
Number of accommodation spaces within the park			64.000 (?)		997			
Number of accommodation spaces within 5 km from the park (including the park)					1471			
Number of guest overnight stays pr. Year (in 1000)			7.000					

Source: [1)] is based on distribution of population from EUROSTAT according to the CORINE land cover classification. The rest is based on information from local accomodations (Maribo), the park authorities or judgements based on their information. A lot of comparable quantitative data is missing.

For the assessment of the recreational carrying capacity of the park the number of tourists coming from outside the region has to be added. Only few estimates of the yearly number of visitors (divided into day and overnight visitors), the tourist capacity in form over overnight stay ('beds') capacities (including camping site capacities) within 5 km from the park and the number of yearly park-related overnight stays within this capacity are (hopefully) given in Table 2.2.

Already through the population figures the marked differences in the pressures on the nature resources of the parks from human population and tourist are clear.

A carrying capacity for tourists cannot however be estimated and negotiated without a concrete relation to the specific protection goals set up for the parks and their resources.

2.4. The natura2000 sites of the Parks of Parks&Benefits

All the parks have a number of specific protection goals formulated at different levels that might be difficult to compare. However, within all of them (except Doverfjell in Norway, outside the EU) there is at least a part of the park area designated as Natura2000-area. The Natura2000 network protection of threatened species and habitat types is the centerpiece of the EU nature & biodiversity policy composed of Habitat Sites (Special Areas of Conservation (SAC or Site of Community Interest (SCI)[3]) under the 1992 Habitats Directive and Birds sites (Special Protection Areas (SPAs) under the 1979 Bird Directive. It also applies to the marine environment.

In Table 2.3 is shown in area (km^2) and share (%) of each park area being covered by Natura2000 habitat sites (SACs or SCIs) and/or birdsites (SPAs), as well as not covered by Natura2000.

Table 2.2: The extent of Natura2000 within the EU nature parks of Parks&Benefits

	BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei
Size of the Park (in km2)	**259,1**	**211,5**	**47,2**	**326,8**	**509,7**	**391,9**	**192,0**
Size of sites being both Habitat and Bird sites	153,7	196,9	38,4	174,2	498,8	373,9	0,0
Size of sites being only Habitat sites (SACs or SCIs)	5,5	0,3	0,0	25,8	0,0	0,0	26,7
Size of sites being only Bird sites (SPAs)	40,3	0,0	0,0	80,2	0,0	0,0	0,0
Size of Natura2000 in the park	199,4	197,1	38,4	280,1	498,8	373,9	26,7
Size of Park not being Natura2000	59,7	14,3	8,8	46,7	10,9	18,0	165,4
Share of sites being both Habitat and Bird sites	59%	93%	81%	53%	98%	95%	0%
Share of sites being only Habitat sites (SACs or SCIs)	2%	0%	0%	8%	0%	0%	14%
Share of sites being only Bird sites (SPAs)	16%	0%	0%	25%	0%	0%	0%
Share of Natura2000 in the park	77%	93%	81%	86%	98%	95%	14%
Share of Park not being Natura2000	23%	7%	19%	14%	2%	5%	86%

Source: Extraction from the EU Natura2000 Database for habitat sites overlapping the 7 EU-parks of Parks&Benefits. The delineation of the parks has been made by Roskilde University based on various map-information from the parks.

[3] See note page 3

The table demonstrates how Natura2000 designations are widespread as a dominating conservation measure in most of the parks (with a more or less parallel national legislation dominating the conservation in Dovrefjell National Park). The most marked exception is Kurtuvenei Regional Park, with 86% of the park not covered by Natura2000. The 14% area with Natura2000 in this park is divided into 10 small habitat sites spread over the park. However all of the parks include minor areas not covered by Natura2000. A comparative analysis of the character and functions of these areas would be interesting in a broader perspective.

The total area of Habitat sites (SACs or SCI), Bird sites (SPAs) and Natura2000-sites (mostly overlapping SACs (SCIs) and SPAs) that are located either within each of the parks or overlapping the borders of that park (meaning stretching beyond the park boundaries) is also calculated. For this area, which in no cases spread to more than 15 km from the park boundaries (on land), further details on the protected nature resources and their threats are shown in Table 2.4. For 2 of the parks, Biosphere Reserve SE Rügen and Matsalu National Park, the overlapping Natura2000 sites are stretching far out in the marine areas. For the overlapping habitat sites spatial statistics on the composition of broad habitats (see part 1.3) has been produced. As can be seen in Table 2.4 a marked variation in broad habitat types are characterizing most of the habitat sites related to the parks – with 16 broad habitat types out of 23 possible types represented in Biosphere Reserve SE Rügen as the most varied, and 8-12 types represented in most of the other parks, however often with small areas.

Table 2.3: The extent and composition of park-related Natura-2000 sites. The composition of the habitat sites overlapping the parks has been obtained through the statistics on the percentage coverage of each broad habitat type within each habitat site overlapping the park. Therefore some minor deviations from the total area by summarizing these data are expected. The marked deviations for Rügen are related to the deficient statistics on the Natura2000 DE174930 Greifswalder Boddenrandschwelle und Teile der Pommerschen Bucht. Only one broad habitat type: Marine areas, Sea inlets is indicated, but with an area of 0 ha. If the total area of this site (404 km^2) is allocated to this broad habitat type, then the total area of Marine areas and Sea inlets in SE Rügen will increase from 579 to 983 km^2, corresponding to 93,7% of the total area of broad habitats. This gives an overall summary of broad habitats in the overlapping habitat sites of Biosphere Reserve SE Rügen of 106,5%.

	BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei
Size of the park (in km2)	**259**	**211**	**47**	**327**	**510**	**392**	**192**
Size of the park+overlapping Natura2000-sites (in km2)	1955	232	47	807	2745	408	192
Size of the overlapping Natura2000-sites (in km2)	1895	214	38	760	2726	383	26
Size of the overlapping Habitat sites (in km2)	1048	214	38	332	2534	383	26
Share of broad habitat types in the overlapping Habitat sites:							
Marine areas, Sea inlets (N01)	55,2%				81,6%	5,0%	
Salt marshes, Salt pastures, Salt steppes (N03)	0,7%						
Coastal sand dunes, Sand beaches, Machair (N04)	0,6%			0,9%			
Shingle, Sea cliffs, Islets (N05)	0,6%						
Inland water bodies (Standing water, Running water) (N06)	0,6%	7,0%	28,7%	42,0%		4,0%	0,7%
Bogs, Marshes, Water fringed vegetation, Fens (N07)	1,3%	1,0%		7,6%	3,0%	20,9%	1,2%
Heath, Scrub, Maquis and Garrigue, Phygrana (N08)	1,2%			2,8%	1,0%	1,2%	
Dry grassland, Steppes (N09)	0,9%			1,0%	6,0%		
Humid grassland, Mesophile grassland (N10)	0,7%			1,6%		2,3%	
Extensive cereal cultures (including Rotation cultures with regular fallowing) (N12)		25,1%				1,0%	4,9%
Improved grassland (N14)		5,0%				3,0%	0,1%
Other arable land (N15)	0,7%	14,0%	45,9%	2,7%	2,0%	1,0%	2,0%
Broad-leaved deciduous woodland (N16)	2,0%	2,0%	22,9%	15,9%	4,0%	10,9%	1,7%
Coniferous woodland (N17)	0,9%	22,0%		26,5%	1,0%	21,9%	64,6%
Mixed woodland (N19)	0,7%	22,0%		2,1%	1,0%	24,9%	24,2%
Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas) (N21)	0,6%						
Inland rocks, Screes, Sands, Permanent Snow and ice (N22)	0,6%			0,3%			
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites) (N23)	0,6%	2,0%	1,7%	1,0%		4,0%	
All broad habitat types	68,0%	100,2%	99,2%	104,5%	99,5%	100,0%	99,4%

Source: Extraction from the EU Natura2000 Database for habitat sites overlapping the 7 EU-parks of Parks&Benefits.

The specific areas within the habitat sites of natural habitats according to a European list of natural habitat types are described for comparison in the next tables and figures.

For their share of the total area of the overlapping habitat sites, see Table 2.5.

Table 2.5: Size and share of the area of listed habitat types according to the European list of Natura2000 habitat types to be protected through the Habitat Directive.

	BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei
Size of the area of listed habitat types in the overlapping Habitat sites (in hectars)	77628	2371	2915	17025	57771	13150	723
Share of the area of listed habitat types in the overlapping Habitat sites (in %)	74	11	76	51	23	34	27
Size of the area of listed non-priority habitat types in the overlapping Habitat sites (in hectars)	**75298**	**1808**	**2608**	**16247**	**42568**	**5480**	**320**
Share of the area of listed non-priority habitat types in the overlapping Habitat sites (in %)	72	8	68	49	17	14	12
Size of the area of listed priority habitat types in the overlapping Habitat sites (in hectars)	**2331**	**563**	**307**	**778**	**15203**	**7670**	**403**
Share of the area of listed priority habitat types in the overlapping Habitat sites (in %)	2	3	8	2	6	20	15

Source: Extraction from the EU Natura2000 Database for habitat sites overlapping the 7 EU-parks of Parks&Benefits.

The dominating occurrence of such areas in Rügen and Matsalu is related to the habitat type: Marine areas, and Sea inlets, that occur rather extensive in these parks. In percentage area, the listed habitat types take up a rather large part of the habitat sites overlapping the parks. The listed priority habitats, representing the nature areas of highest priority within the EU nature protection policy takes up a much smaller part of the overlapping habitat sites, but are however represented in all the parks. An overview of the listed priority and non-priority habitat types in the parks are given in Table 2.6 and 2.7.

At a European level 231 habitat types have been listed in the Annex of the Habitat Directive. Of these are 55 represented in the habitat sites overlapping the 7 parks of Parks&Benefits being located within the EU. The largest numbers of habitat types represented are in Biosphere Reserve SE Rügen (27), Kemeri National Park (26) and Matsalu National Park (25). Up to 75 of the 231 habitat types are have the status of 'priority habitats'. 17 of these priority habitat types are represented in the habitat sites related to the 7 parks, most abundant in Matsalu National Park (9) and Kemeri National Park (9). Especially in Matsalu National Park these priority habitat types are represented by rather large areas, partly complemented by a good representation of other priority habitat types in Kemeri National Park.

Table 2.6: European listed priority habitat types within the park-related habitat sites (SACs or SCIs). Priority habitat types are the habitat types with the highest conservational priority at a European level.

	BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei	Gran Total
Size of the park (in km2)	**259,12**	**211,49**	**47,15**	**326,78**	**509,66**	**391,94**	**192,04**	**1938,18**
Numbers of NATURA2000 listed habitat types represented in each park	27	15	16	20	23	26	14	55
Priority habitat types (in hectars):	**2331**	**563**	**307**	**778**	**15203**	**7670**	**403**	**27254**
Active raised bogs						3817	15	3832
Salicion albae)	18	27	192	39		382		658
Bog woodland	125	364	38	392		1909	231	3059
Boreal Baltic coastal meadows					6081			6081
Calcareous fens with Cladium mariscus and species of the Caricion davallianae		15	38	341	253	19	10	677
Coastal lagoons	2103				760			2863
Fennoscandian deciduous swamp woods		73			3041	763	7	3883
Fennoscandian hemiboreal natural old broad-leaved deciduous forests (Quercus, Tilia, Acer, Fraxinus or Ulmus) rich in epiphytes					1267	8		1275
Fennoscandian lowland species-rich dry to mesic grasslands					507	0		507
Fennoscandian wooded meadows					507			507
Fixed coastal dunes with herbaceous vegetation ("grey dunes")	27					8		34
Inland salt meadows			38					38
Nordic alvar and precambrian calcareous flatrocks					2027			2027
submountain areas in Continental Europe)	30	11						41
Tilio-Acerion forests of slopes, screes and ravines	28							28
Western Taïga		73			760	765	141	1738
Xeric sand calcareous grasslands				6				6
Numbers of priority habitat types represented in each park	6	6	4	3	9	9	5	17

Source: Extraction from the EU Natura2000 Database for habitat sites overlapping the 7 EU-parks of Parks&Benefits.

Table 2.7 shows the distribution of number and area of the remaining non-priority listed habitat types within the habitat sites overlapping the 7 parks. In no cases less than 9 of the 38 habitat types can be found in the habitat sites related to the park, with Biosphere Reserve Rügen showing the largest variation of non-priority habitat types (21). The large coverage of these habitats in Rügen is especially related to the coastal areas, at the same time being the most difficult areas to manage in a visitor carrying capacity context.

Table 2.7: European listed non-priority habitat types within the park-related habitat sites (SACs or SCIs).

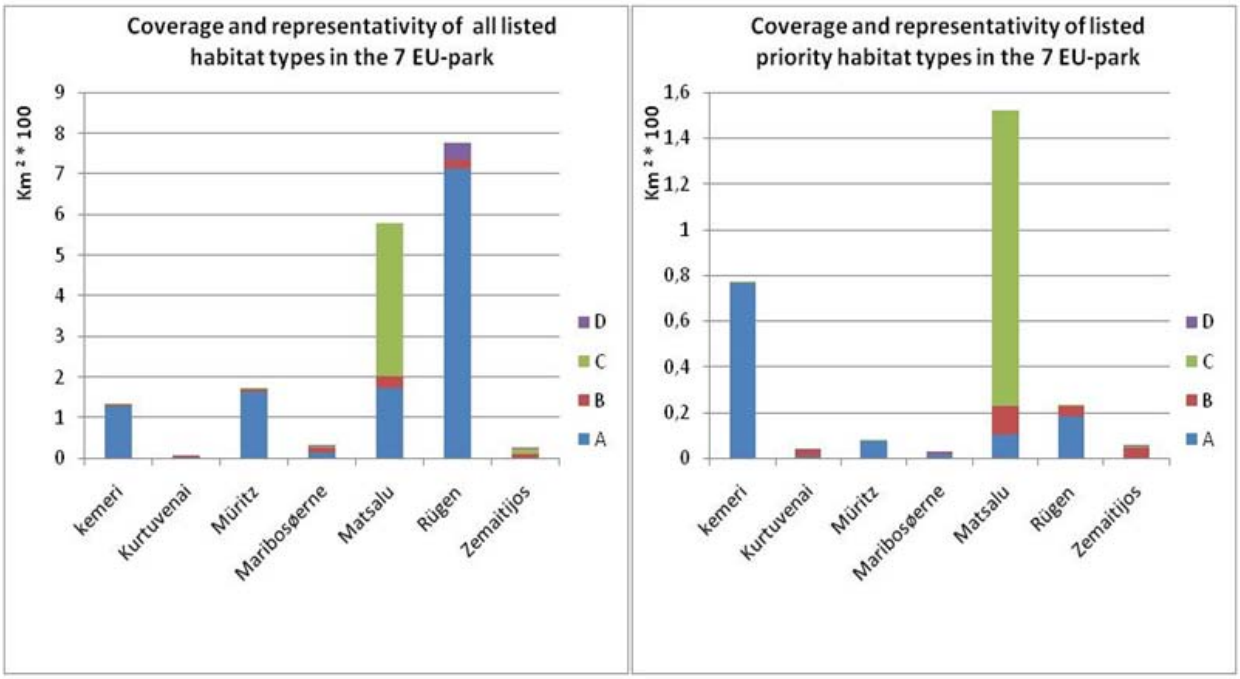
	BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei	Gran Total
Non-priority listed habitat types (in hectars):	**75298**	**1808**	**2608**	**16247**	**42568**	**5480**	**320**	**144330**
Alkaline fens	0	182	38	74	1014	5	37	1350
Annual vegetation of drift lines	39							39
Asperulo-Fagetum beech forests	853		230	737				1821
Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)		55						55
Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	1008							1008
Boreal Baltic islets and small islands					760			760
Boreal Baltic sandy beaches with perennial vegetation						4		4
Calcareous rocky slopes with chasmophytic vegetation								
Degraded raised bogs still capable of natural regeneration						1909		1909
Depressions on peat substrates of the Rhynchosporion						38		38
Dry sand heaths with Calluna and Empetrum nigrum								
Embryonic shifting dunes						8		8
Estuaries					5574			5574
European dry heaths								
Fennoscandian herb-rich forests with Picea abies		182					46	228
Fennoscandian mineral-rich springs and springfens							41	41
Fennoscandian wooded pastures					760			760
Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.		1275	959	12488		1145		15867
Humid dune slacks								
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels			38	4	760	4		806
Juniperus communis formations on heaths or calcareous grasslands				67	1014			1080
Large shallow inlets and bays	45965				6335			52299
Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	7			35	760	20	10	832
Luzulo-Fagetum beech forests	542		38	936				1516
Medio-European limestone beech forests of the Cephalanthero-Fagion			38					38
Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)		2	38	23	253	38		355
Mudflats and sandflats not covered by seawater at low tide	1528				3547			5076
Natural dystrophic lakes and ponds	3	9	38	92		76	21	239
Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	20	5	1074	1139		57	3	2299
Northern boreal alluvial meadows		7			4308	215	11	4540
Old acidophilous oak woods with Quercus robur on sandy plains	65			176				241
Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea				148				148
Perennial vegetation of stony banks	1							1
Reefs	14765				2280			17045
Salicornia and other annuals colonizing mud and sand								
Sandbanks which are slightly covered by sea water all the time	9788				14696	1145		25629
Brometalia) (* important orchid sites)	101		38	10	507		14	671
Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	18					11		29
Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	27		38	176		4		246
Transition mires and quaking bogs	11	91	38	135		38	137	451
Vegetated sea cliffs of the Atlantic and Baltic Coasts	148							148
Batrachion vegetation	1			7				8
Wooded dunes of the Atlantic, Continental and Boreal region	408					763		1171
Numbers of non-priority habitat types represented in each park	21	9	12	17	14	17	9	38

Source: Extraction from the EU Natura2000 Database for habitat sites overlapping the 7 EU-parks of Parks&Benefits.

The columns in Figure 2.2 and 2.3 show graphically an estimate of the total area of the listed habitat types within the habitat sites overlapping each of the 7 EU-nature parks, additionally giving information on the representativity of the listed habitat types at a European level, meaning how

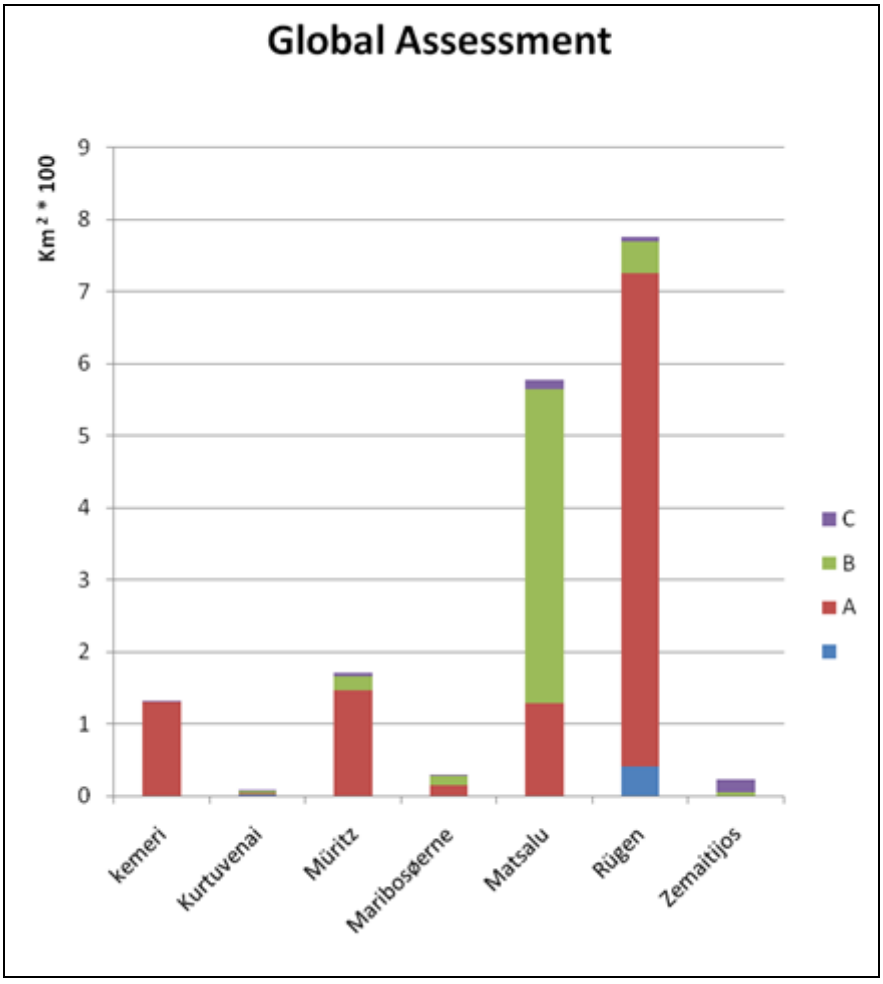
typical the occurrence of the nature type in the related habitat sites are for the nature type. In the right figure are the habitats with the highest EU-protectional priority, the so-called priority habitats. With the exception of Zemaitijos National Park, a considerable part of the listed habitat type area is judged to be in category A, meaning to have an excellent representativity for the protection of the habitat types within Europe.

Figure 2.2 and 2.3: Coverage and representativity of the listed habitat types within the park-overlapping habitat sites. To the left is shown coverage and representativity of all listed habitat types, to the right the habitats with the highest EU-protectional priority, the so-called priority habitats. A (blue): Excellent representativity, B (red): good represemtativity, C (green): significant representativity, D(lilac): non-significant representativity.



Source: Extraction from the EU Natura2000 Database for habitat sites overlapping the 7 EU-parks of Parks&Benefits.

Figure 1.4: Global assessment of the values of the listed habitat types within the park-overlapping habitat sites. A (red): Excellent value, B (green): good value, C (lilac): significant value, (Blue colour): no information on global assessment, since the habitat types are of non-significant representativity.



Source: Extraction from the EU Natura2000 Database for habitat sites overlapping the 7 EU-parks of Parks&Benefits.

Table 2.8: European listed birds within the park-related Natura2000 sites.

	BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei		BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei
Birds (132 listed species)	**92**	**22**	**14**	**82**	**76**	**57**	**0**								
Acrocephalus paludicola	1							Glaucidium passerinum					1	1	
Aegolius funereus				1		1		Grus grus	1	1	1	1	1	1	
Alca torda	1							Haematopus ostralegus	1						
Alcedo atthis	1	1		1		1		Haliaeetus albicilla	1		1	1	1	1	
Anas acuta	1			1	1			Hydroprogne caspia				1			
Anas clypeata	1		1	1	1			Ixobrychus minutus						1	
Anas crecca	1			1	1			Jynx torquilla	1			1			
Anas penelope	1			1	1			Lanius collurio	1	1		1	1	1	
Anas platyrhynchos	1			1	1			Lanius excubitor	1			1			
Anas querquedula	1			1	1			Larus canus	1				1		
Anas strepera	1			1	1			Larus fuscus					1		
Anser albifrons	1			1	1	1		Larus melanocephalus	1						
Anser anser	1		1	1	1			Larus minutus	1			1		1	
Anser erythropus				1	1			Larus ridibundus	1			1	1		
Anser fabalis	1			1	1	1		Limicola falcinellus					1		
Anthus campestris		1						Limosa lapponica	1				1		
Aquila pomarina		1				1		Limosa limosa				1	1		
Ardea cinerea					1			Lullula arborea	1	1		1		1	
Arenaria interpres					1			Luscinia svecica cyanecula				1			
Asio flammeus	1			1	1			Melanitta fusca	1				1		
Aythya ferina	1		1	1	1			Melanitta nigra	1				1		
Aythya fuligula	1		1	1	1			Mergus albellus	1		1	1	1	1	
Aythya marila	1			1	1			Mergus merganser	1		1	1	1		
Bonasa bonasia		1				1		Mergus serrator	1				1		
Botaurus stellaris	1	1	1	1	1	1		Miliaria calandra	1						
Branta bernicla					1			Milvus migrans	1	1		1		1	
Branta leucopsis	1			1	1	1		Milvus milvus	1			1			
Bubo bubo					1	1		Muscicapa striata	1			1			
Bucephala clangula	1			1	1			Netta rufina				1			
Calidris alpina	1			1				Numenius arquata	1			1	1		
Calidris alpina schinzii					1			Oenanthe oenanthe	1			1			
Calidris alpina ssp. schinzii	1							Pandion haliaetus				1		1	
Calidris canutus					1			Pernis apivorus	1	1	1	1		1	
Caprimulgus europaeus		1		1		1		Phalacrocorax carbo			1	1	1		
Charadrius dubius					1			Phalacrocorax carbo sinensis	1			1			
Charadrius hiaticula	1			1	1			Phalaropus lobatus	1						
Chlidonias niger	1			1	1	1		Philomachus pugnax	1			1	1	1	
Ciconia ciconia	1	1		1	1	1		Phoenicurus phoenicurus	1			1			
Ciconia nigra		1		1		1		Picoides tridactylus						1	
Circaetus gallicus						1		Picus canus		1			1	1	
Circus aeruginosus	1	1	1	1	1	1		Pluvialis apricaria	1			1		1	
Circus cyaneus	1			1	1	1		Pluvialis squatarola					1		
Circus pygargus	1	1		1		1		Podiceps auritus	1					1	
Clangula hyemalis	1				1			Podiceps cristatus	1			1	1		
Corvus monedula	1			1				Porzana parva					1	1	
Coturnix coturnix	1			1				Porzana porzana		1		1	1	1	
Crex crex	1	1		1	1	1		Recurvirostra avosetta	1				1		
Cygnus columbianus				1				Riparia riparia	1			1			
Cygnus columbianus bewickii	1				1	1		Scolopax rusticola	1			1			
Cygnus cygnus	1			1	1	1		Somateria mollissima	1				1		
Cygnus olor	1			1	1			Sterna albifrons	1			1	1	1	
Dendrocopos leucotos					1	1		Sterna caspia	1				1	1	
Dendrocopos medius	1			1		1		Sterna hirundo	1			1	1	1	
Dryocopus martius	1	1		1		1		Sterna paradisaea	1				1	1	
Egretta alba				1		1		Sterna sandvicensis	1				1	1	
Emberiza calandra				1				Streptopelia turtur	1			1			
Emberiza hortulana				1	1	1		Sylvia nisoria	1	1		1	1	1	
Falco columbarius	1			1		1		Tadorna tadorna	1						
Falco peregrinus	1			1		1		Tetrao tetrix tetrix		1			1	1	
Falco tinnunculus	1			1				Tetrao urogallus						1	
Ficedula parva	1	1		1		1		Tringa erythropus					1		
Fulica atra	1			1	1			Tringa glareola	1			1	1	1	
Gallinago gallinago	1			1				Tringa nebularia					1		
Gallinago media					1			Tringa totanus	1				1		
Gavia arctica	1					1		Uria aalge	1						
Gavia stellata	1					1		Vanellus vanellus	1			1	1		

Source: Extraction from the EU Natura2000 Database for Bird sites overlapping the 7 EU-parks of Parks&Benefits.

Table 2.9: Other European listed species within the park-related Natura2000-sites

	BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei		BR SE Rügen	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri	NLP Kurtuvenei
Amphibian	**1**	**0**	**1**	**3**	**0**	**1**	**0**	**Mammal**	**6**	**1**	**1**	**5**	**4**	**2**	**0**
Bombina bombina				1				Barbastella barbastellus			1	1			
Emys orbicularis				1				Castor fiber				1			
Triturus cristatus	1		1	1		1		Halichoerus grypus	1				1		
								Lutra lutra	1			1	1	1	
Fish	**6**	**0**	**1**	**4**	**4**	**6**	**0**	Lynx lynx		1					
Acipenser oxyrinchus	1							Myotis dasycneme	1			1	1	1	
Alosa fallax	1							Myotis myotis	1			1			
Aspius aspius	1							Phoca hispida bottnica					1		
Cobitis taenia			1	1	1	1		Phoca vitulina	1						
Cottus gobio					1	1		Phocoena phocoena	1						
Lampetra fluviatilis	1				1	1									
Lampetra planeri				1		1									
Misgurnus fossilis				1	1	1		Plant	**1**	**3**	**0**	**3**	**9**	**8**	**2**
Petromyzon marinus	1							Agrimonia pilosa						1	
Rhodeus sericeus amarus	1			1		1		Angelica palustris					1		
								Apium repens				1			
Invertebrate	**4**	**1**	**1**	**8**	**6**	**5**	**0**	Botrychium simplex		1					
Dytiscus latissimus				1				Cypripedium calceolus					1	1	
Euphydryas aurinia					1	1		Dianthus arenarius ssp. arenarius					1	1	
Euphydryas maturna					1	1		Dicranum viride					1	1	
Graphoderus bilineatus				1		1		Drepanocladus vernicosus		1		1			
Leucorrhinia pectoralis	1			1				Encalypta mutica					1		
Lycaena dispar	1			1				Liparis loeselii	1	1		1	1	1	1
Osmoderma eremita				1				Pulsatilla patens						1	
Unio crassus				1	1	1		Saussurea alpina ssp. esthonica						1	
Vertigo angustior	1			1	1	1		Saxifraga hirculus						1	1
Vertigo genesii					1			Sisymbrium supinum					1		
Vertigo geyeri		1			1			Thesium ebracteatum					1		
Vertigo moulinsiana	1		1	1				Tortella rigens					1		

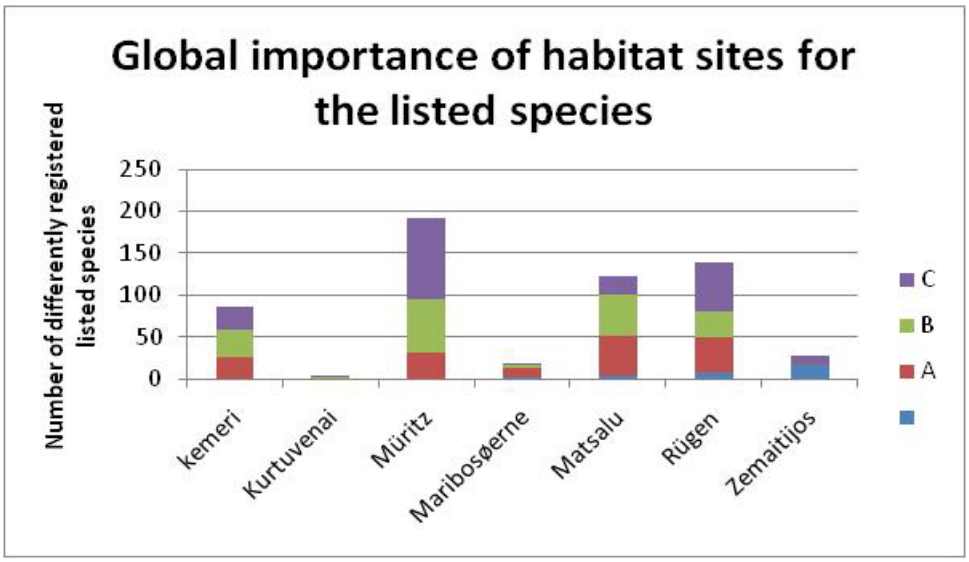
Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping the 7 EU-parks of Parks&Benefits.

Different assessments of the local character of the listed habitat types, concerning representativity, the share of the national surface and the conservation status have been produced for the Natura2000 statistics (see Chapter 3 for the individual parks). These have been combined in an overall global assessment shown in Figure 2.4. Again, with the exception of Žemaitja National Park, most of the parks show a vast majority of excellent or good values.

In Table 2.8 and 2.9 is given an overview of listed species of European importance in the

Natura2000 areas overlapping the 7 EU parks of Parks&Benefits. In few cases, information on protected very rare species has been removed from the statistics by national authorities. In Figure 2.5 is shown a comparison of the number of listed species and the distribution of the assessed global importance of the overlapping Natura2000 sites for the protection of the species.

Figure 2.5: Number of differently registered listed species, and the global importance of the overlapping Natura2000 sites for the protection of the species. A (red): Excellent value, B (green): good value, C (lilac): significant value, (Blue colour): no information on global assessment, since the Natura2000-sites are judged to have a non-significant representativity for the species. Since different habitat sites can be evaluated to have different quality for a species, a species count for each different quality assessment for a species has been made. Therefore the species-numbers for each park exceeds the total species number that can be counted together from table 6a and 6 b. Nevertheless the figure gives a rather precise impression of the quality of the habitats for the amount of listed species expressed by the global importance.



Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping the 7 EU-parks of Parks&Benefits.

2.5. A overview of carrying capacity problems in the 8 parks of Parks&Benefits

The following summary of general information on carrying capacity problems presented at a meeting in Parks&Benefits 14th October 2010 is based on the summary notes by Olaf Ostermann, with our additions and further interpretations. It shows that although none of the parks up to now have established any coherent system for management of tourist carrying capacity through combined monitoring of visitors and development of related indicators and standards, most of the parks are dealing actively with monitoring and management of man-nature and/or man-man conflicts in different types of hot spots. In all 18 conflicts were described, equally divided into 9 predominantly man-nature-conflicts, and 9 man-man conflicts. The registration and public

presentation of the conflicts have been very different from park to park, and the same goes for the way of management used for handling the conflicts. A limited number of indicators were presented and very few standards to be used as guidelines for management were presented.

Table 2.10: An overview of carrying capacity problems in the 8 parks of Parks&Benefits

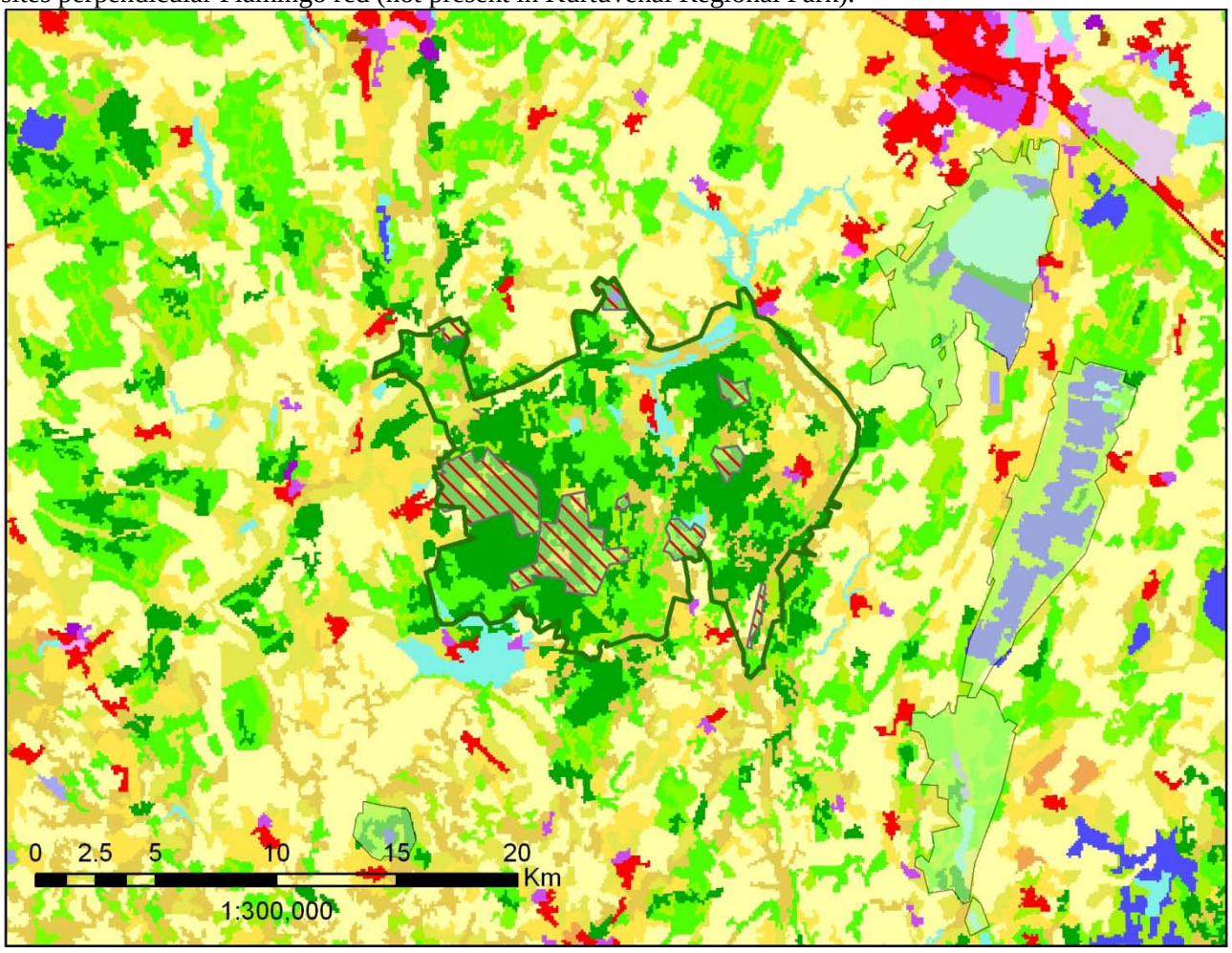
	BR SE Rügen	NLP Dovrefjell	NLP Zemaitija	NP Maribo	NLP Müritz	NLP Matsalu	NLP Kemeri
Examples of hot spots (conflicts) described	4	1	-	5	3	2	3
Division into man-nature and man-man conflict	3 1	1 0	0 0	2 3	1 2	1 1	2 1
Most important conflict(s)	*man-nature:* Greifswalder Bodden (fishing,water tourism/birds) *man-man:*traffic	rendeer carving area at Kongsvoll	(recrea-tion)	fishing, sailing / waterbirds	cycle path; crane-wathing; canoe-route	Traffic:dust; people on private land; people/dogs	Coastal forests; trampling + littering; fire, erosions
How has cc conflicts been registered/presented?	Participa-tory process	Parlia-ment decision/Research programmes	-	government decision/vulnerability plan at county level	Agreement with NLP-guides; Delphi-method	management plan	-
Examples of related indicators and standards?	Number of fishermen/fishing-pikes; restrictions in zones	Spatial behaviour of rendeer vs. Spatial behaveour of visitors	Restrictions in zones	Restrictions in zones	Max. group size (25); max. visitors per evening (160)	-	vegetation cover; number of fires
How is carrying capacity managed?	*Local man-nature conflicts:* Common agreements (except for some marine areas); *Man-man conflicts:* No agreement Monitoring	Removal of military sites, removal of roads; intensive monitoring	Control of zonation	Control of restrict-tions	Evaluation before and after crane season	Communication	Parking fees; wooden paths

Source: Based on a summary of Olaf Ostermann, Haapsalu, Estonia, October 2010.

3. A comparable description of the main conservational goals and carrying capacity problems of the 8 parks in Parks&Benefits

3.1. Kurtuvenai Regional Park

Map 3.1: Natura2000 sites in an around Kurtuvenai Regional Park. For the CORINE legend of the land cover, see Appendix A. All Natura2000 areas in and around the park (delineated with a dark green stroke) have a semitransparent light green overlay. Habitat sites overlapping the park has been dark red shaded, Bird sites perpendicular Flamingo red (not present in Kurtuvenai Regional Park).

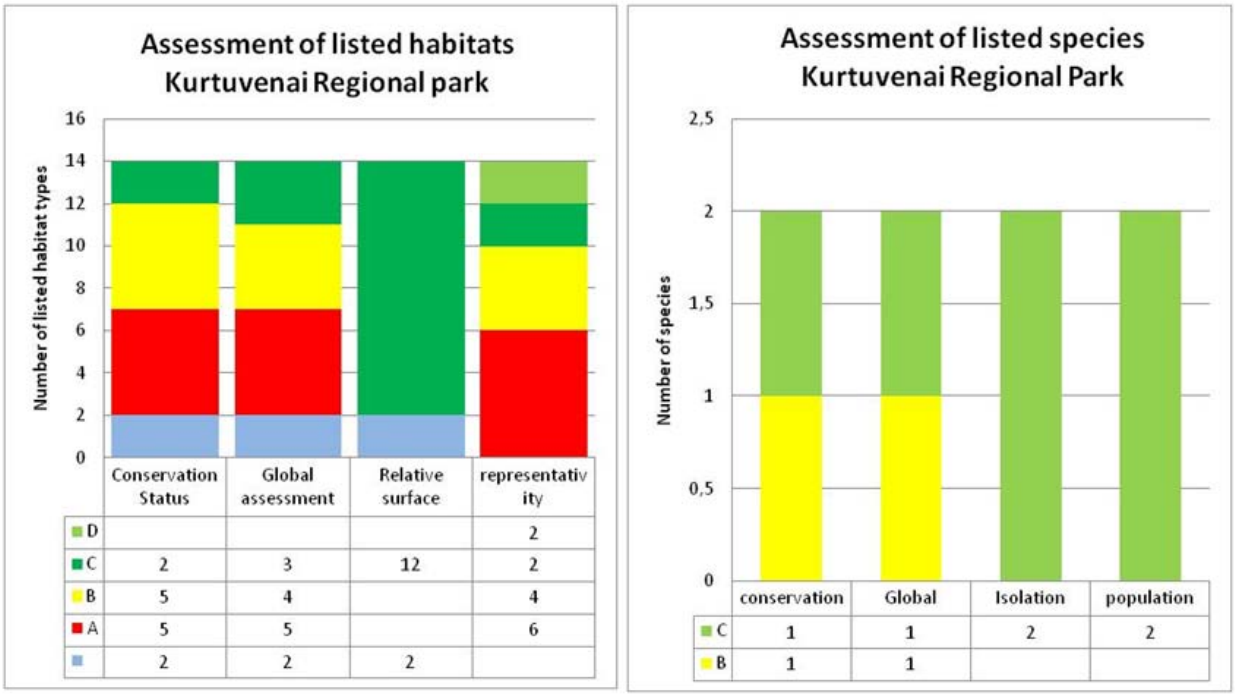


Source: EU CORINE Land Cover Database and EU Natura2000 Database. Deliniation of the parks by Roskilde University.

Although more than 1000 species of plants have been reported in Kurtuvenai Regional Park, including more than 40 species on the Lithuanian red list of extinct and endangered species, as well as many, especially migrating birds, international obligations related to nature conservation only cover a minor part of the park. Ten rather small areas within the park are appointed under the Natura2000 Habitat directive with a total area of 26 km^2, corresponding to 14% of the total park

area. Most of this area is dominated by coniferous and mixed woodland, but dispersed in the area 14 different types of protected habitats are represented, of which 5 are priority habitat types. However all of them only covering a minor part of the total national area of the habitat type. Especially among the bogs and mires in the middle of the park, very good conservation status and high general ecological assessment of the protected habitat types has been found. Species conservation is of minor importance: Only the location of two plant species in the areas seems of a certain national importance for conservation.

Figure 3.1: Conservational characteristics of listed habitat types and species in Kurtuvenai Regional park. For the ranking system (A,B,C,D), see part 1.3. Where the representativity of a habitat type has been assessed to be of non-significant presence (D), no further assessments have been done (blue colour).



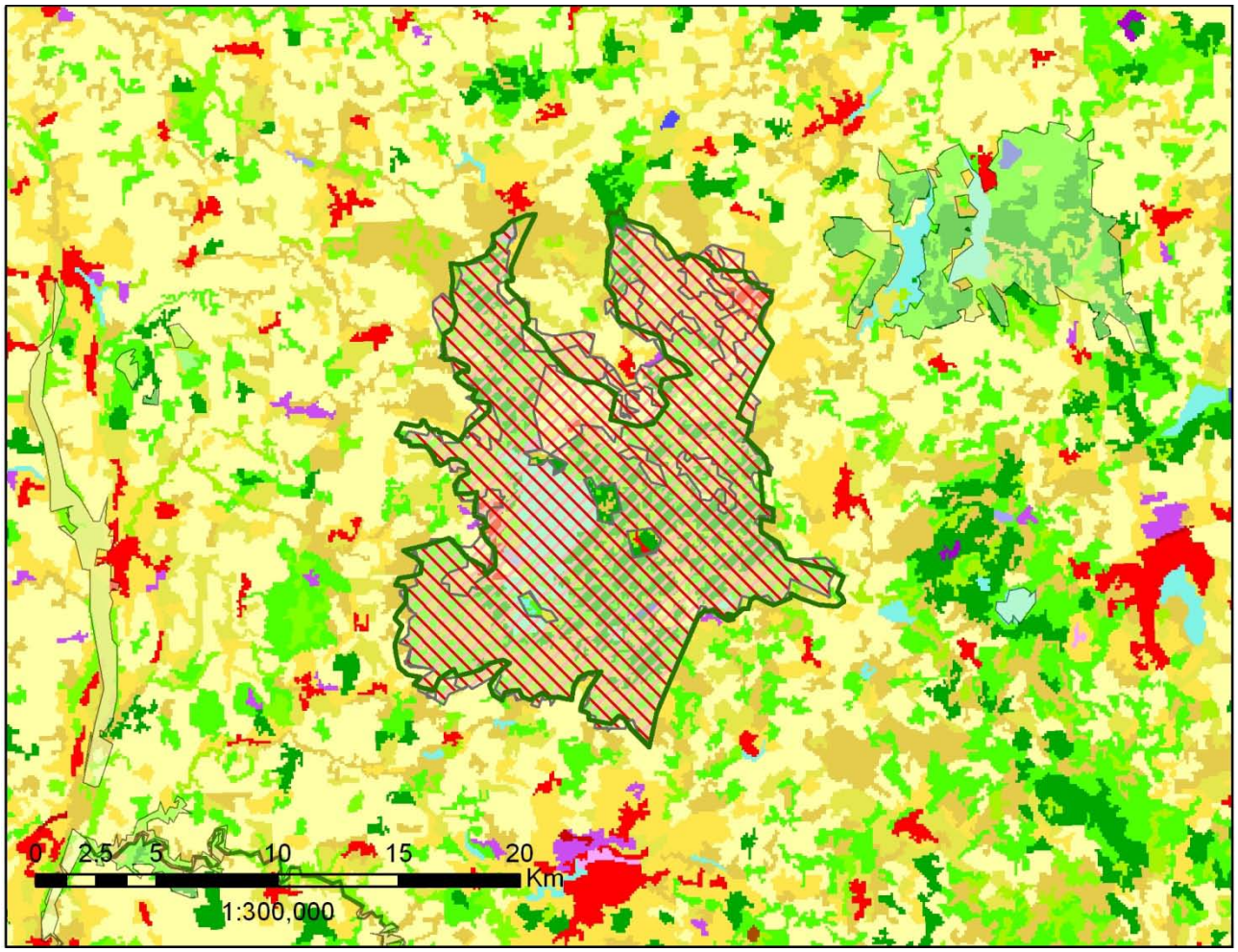
Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping Kurtuvenai Regional park.

A certain negative human impact on the Natura2000 sites has been registered, however in most cases with a very limited spatial extent. The improved access within the park related to the development of the regional park has been considered a negative but low impact on some protected areas, due to discharges, leisure fishing, hunting and collecting activities. A minor eutrophication of protected areas has also been observed.

No information is given on monitoring of tourist activities and their impact on the natural and cultural resources, as well as examples of conflict areas, where problems of carrying capacity-considerations might be relevant.

3.2. Žemaitija National Park

Map 3.2: Natura2000 sites in an around Žemaitija National Park. For the CORINE legend of the land cover, see Appendix A. All Natura2000 areas in and around the park (delineated with a dark green stroke) have a semitransparent light green overlay. Habitat sites overlapping the park has been dark red shaded, Bird sites perpendicular Flamingo red.

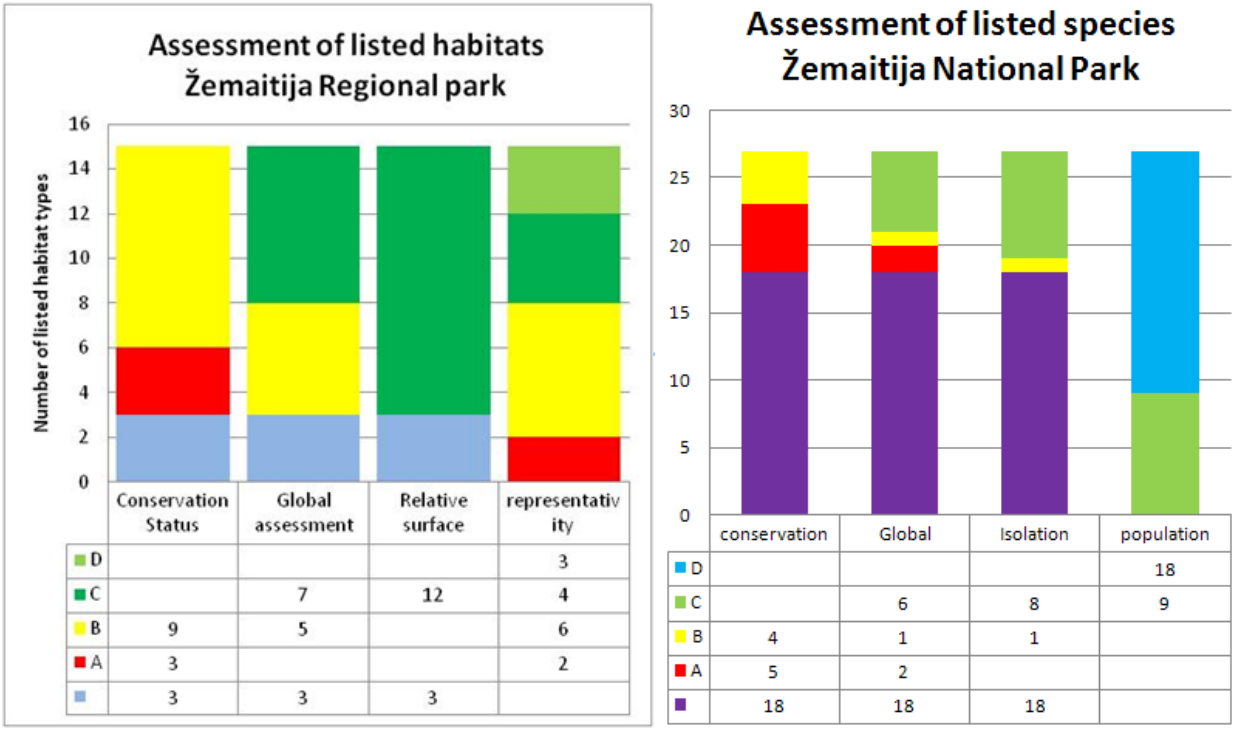


Source: EU CORINE Land Cover Database and EU Natura2000 Database. Deliniation of the parks by Roskilde University.

With some exceptions along the borders, where the bird protection area has been enlarged (corrections might be needed!), Žemaitija National Park is covered by and delineated in the same way as a 182 km^2 designated Natura2000area, comprising both protection under the bird directive and the habitat directive. Half of the area is covered by forest (mainly coniferous and mixed woodland), 1/3 of arable land, and 8% covered by 26 lakes, of which the Lake Plateliai is the biggest. 15 different habitat types are registered (with 6 as priority habitat types), of which especially the occurrence of natural dystrophic lakes and ponds and some types of alluvial forests have a high representativity and conservation status. 27 species (among them 22 species of birds)

are listed, of which only the occurrence of two plant species has been given a very good global assessment in Natura2000. However, none of the protected habitat types and species within the park covers more than a few % of the national habitat type area or of the national number of the protected species.

Figure 3.2: Conservational characteristics of listed habitat types and species in Žemaitija National Park. For the ranking system (A,B,C,D), see part 1.3. Where the representativity of a habitat type has been assessed to be of non-significant presence (D), no further assessments have been done (blue colour for no data).



Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping Žemaitija National Park.

A certain negative impact of very different types of human impact, including tourism has been registered, however in most cases either at a low level or of modest spatial extent (taking/removal of flora in general, infilling of ditches, dykes, ponds etc, nautical sports, walking, horse riding and non-motorised vehicles, taking place on up to 10 % of the protected area).

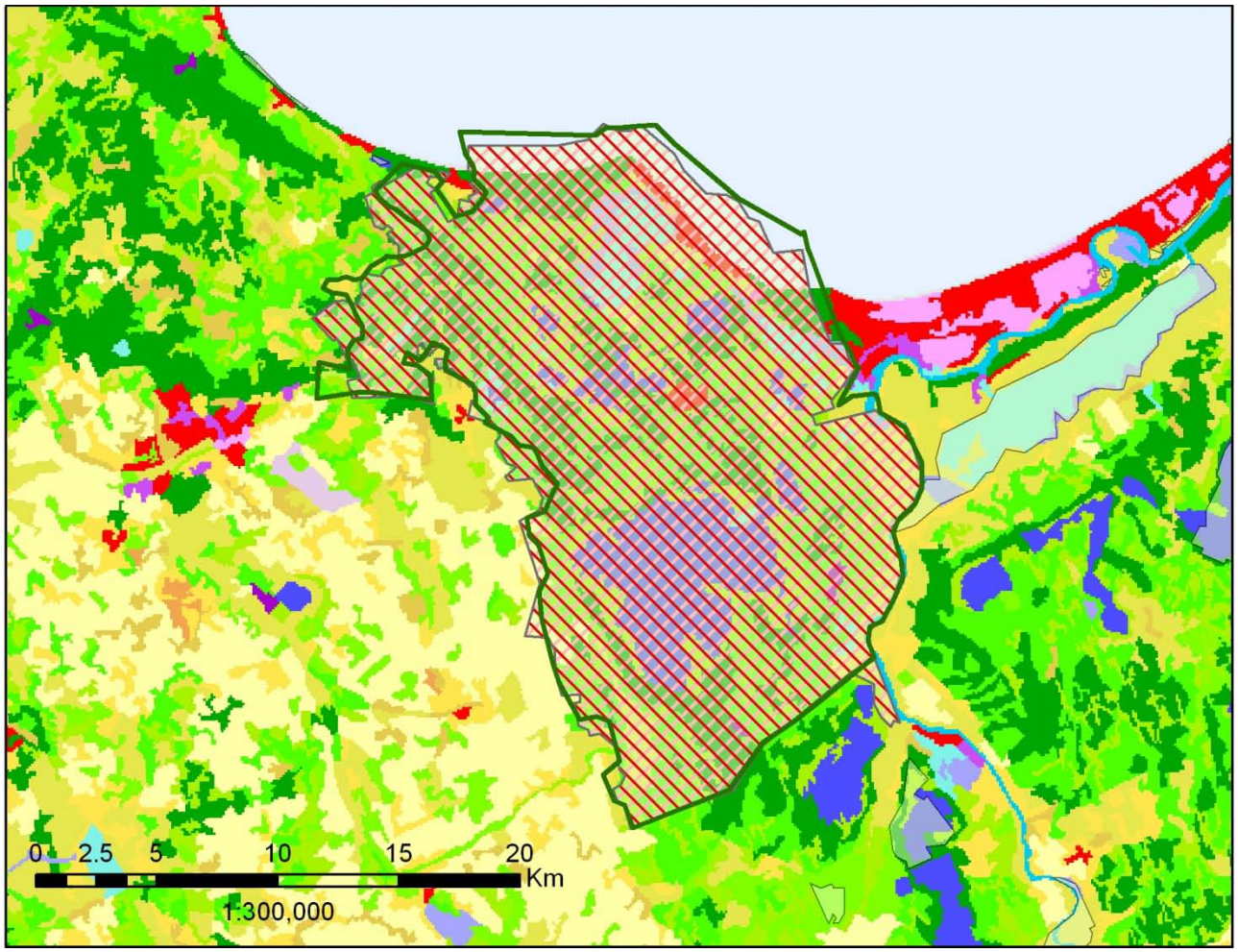
For the monitoring of tourists and their impact a landscape and visitor monitoring system has been developed, focusing on regular repeated landscape monitoring by photo fixation, visitors counting, measuring of recreational waste and impact and visitor need's survey at the visitor centre.

No overall carrying capacity has been estimated or set up, but to manage the visitor flow a functional zoning has been made, allocating almost half of the area to strict nature reserves and

nature reserves, 14 % to a protection zone, 2% to a recreational zone and the rest (30%) for a farming/economic zone. In relation to a planned extension of new territories for Natura2000, this zoning will be changed and adapted to the new appointments. Stronger restrictions are expected, but due to the fact that the majority of the Park area is privately owned, this might give rise to problems for a future management of the carrying capacity for tourists. Improvement of the recreational paths is needed to prevent that visitors are going beyond the paths.

3.3. Ķemeri National Park

Map 3.3: Natura2000 sites in an around Ķemeri National Park. For the CORINE legend of the land cover, see Appendix A. All Natura2000 areas in and around the park (delineated with a dark green stroke) have a semitransparent light green overlay. Habitat sites overlapping the park has been dark red shaded, Bird sites perpendicular Flamingo red.

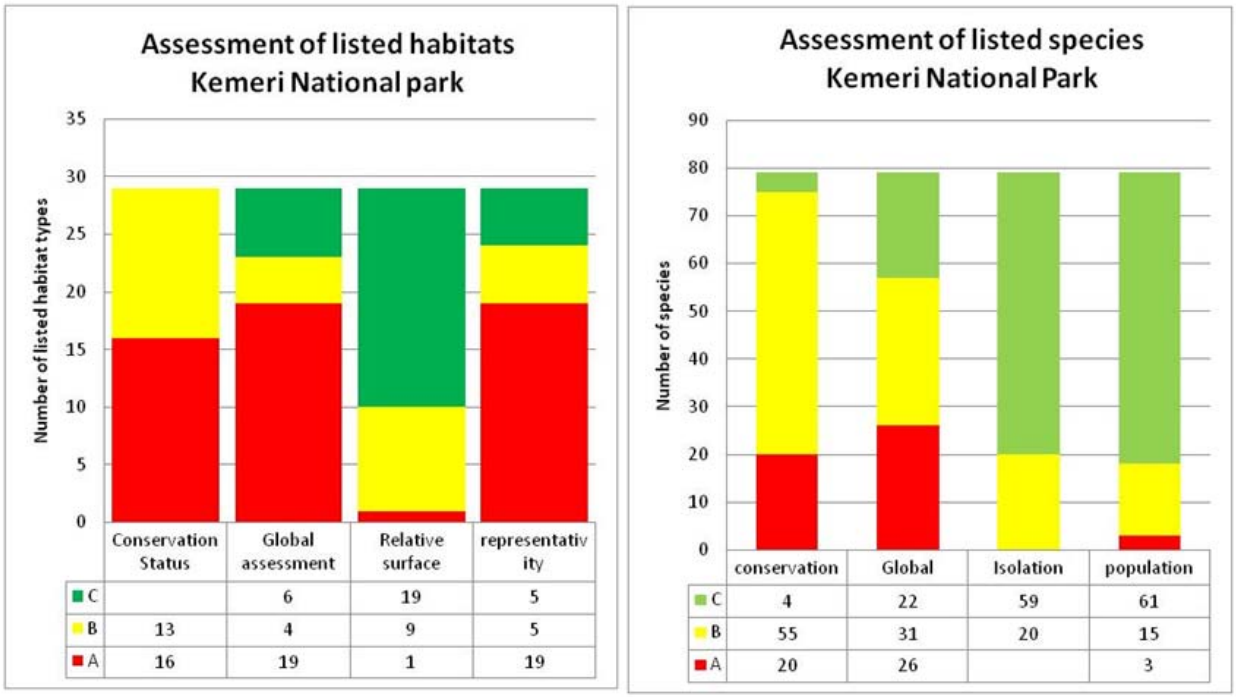


Source: EU CORINE Land Cover Database and EU Natura2000 Database. Deliniation of the parks by Roskilde University.

With few exceptions Ķemeri National Park is covered by and delineated as a 382 km^2 designated Natura2000area, comprising both protection under the bird directive and the habitat directive. Coniferous, broad-leaved deciduous and mixed woodland comprises 58% of the area, bogs, marshes, fens, inland water and marine areas 30%, the rest divided into extensive agricultural land and build up areas. The area contains a very varied habitat composition. 29 different European listed habitat types have been registered (10 are priority habitat types) of which active raised bogs, bog woodlands and degraded raised bogs are dominating by area. The conservation status of all

these habitat types have been assessed to be good to very good and the majority judged to show a very good representativity of their type. Their global assessment is estimated to be of very high value, giving Ķemeri National Park the highest number of general high valued protected habitat types among the nature parks attached to Parks&Benefits. The occurrence of 10 of the 29 habitat types are estimated to cover an area of national importance (>2%).

Figure 3.3: 12 Conservational characteristics of listed habitat types and species in Ķemeri National Park. For the ranking system (A,B,C,D), see part 1.3. Where the representativity of a habitat type has been assessed to be of non-significant presence (D), no further assessments have been done (blue colour for no data).



Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping Ķemeri National Park.

79 species are listed in the Natura2000 annexes, of which 58 are birds. For two of these species (the birds Podiceps auritus and Porzana parva), Ķemeri National Park is estimated to comprise an important part (>15%) of the national stock. The conservation status of the habitat conditions for the vast majority of the species is assessed to be good to very good. For 24 of the species, Ķemeri National Park is globally judged to be of very high importance for the conservation of the species.

A medium intensity of negative human impact from a variety of activities has been registered, of which removal of dead and dying trees, drainage, hunting and disposal of household waste has influenced more than 20% of the Park area. Management of water levels on a minor area has been assessed to be of high intensity. Tourist and leisure activities such as paths and cycling tracks, leisure fishing, walking, horse riding and hunting is also mentioned as human impacts, but their

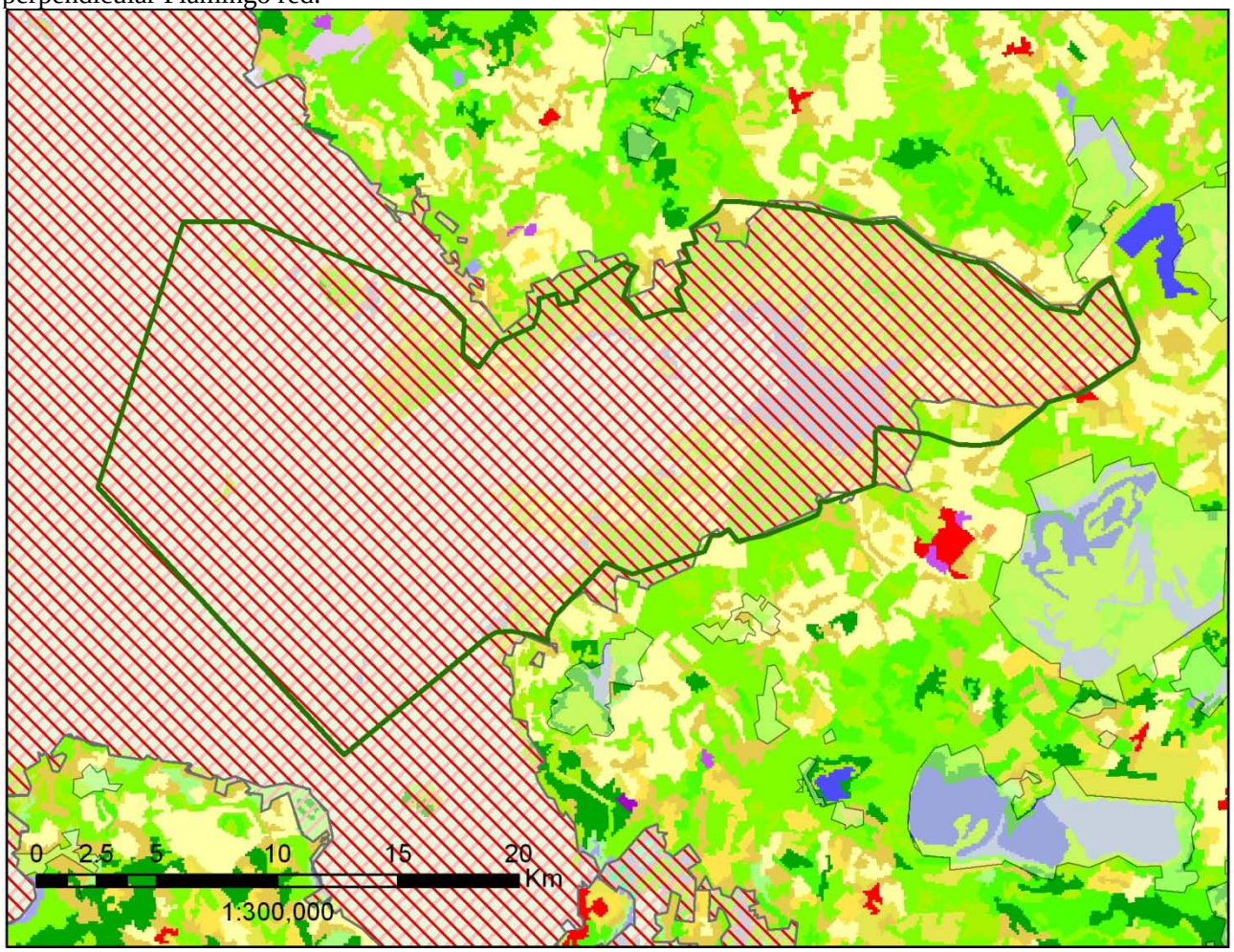
influence has in general been judged to be neutral for the conserved habitats and species.

The main carrying capacity conflict areas are located along the coastal forests, the recreation areas near the lakes, and (especially the eastern?) forests and bogs during season of berry and mushroom picking. In these situations the main impacts are trampling, littering and (illegal) fires. Therefore monitoring concentrates on photo monitoring and development of indicator methods concerning anthropogenic impact in these conflict areas. Despite the very popular picking of mushrooms and berries during the season, it does not seem to influence the natural capacity for regeneration.

To prevent spatial spread of visitor-induced impacts forest roads have been closed for cars. This has however only enlarged the pressure on the coastal areas, having only 2 parking places. The pressure is planned to be reduced through building of 15 wooden stairs to protect the coast in 2011.

3.4. Matsalu National Park

Map 3.4: Natura2000 sites in an around Matsalu National Park. For the CORINE legend of the land cover, see Appendix A. All Natura2000 areas in and around the park (delineated with a dark green stroke) have a semitransparent light green overlay. Habitat sites overlapping the park has been dark red shaded, Bird sites perpendicular Flamingo red.

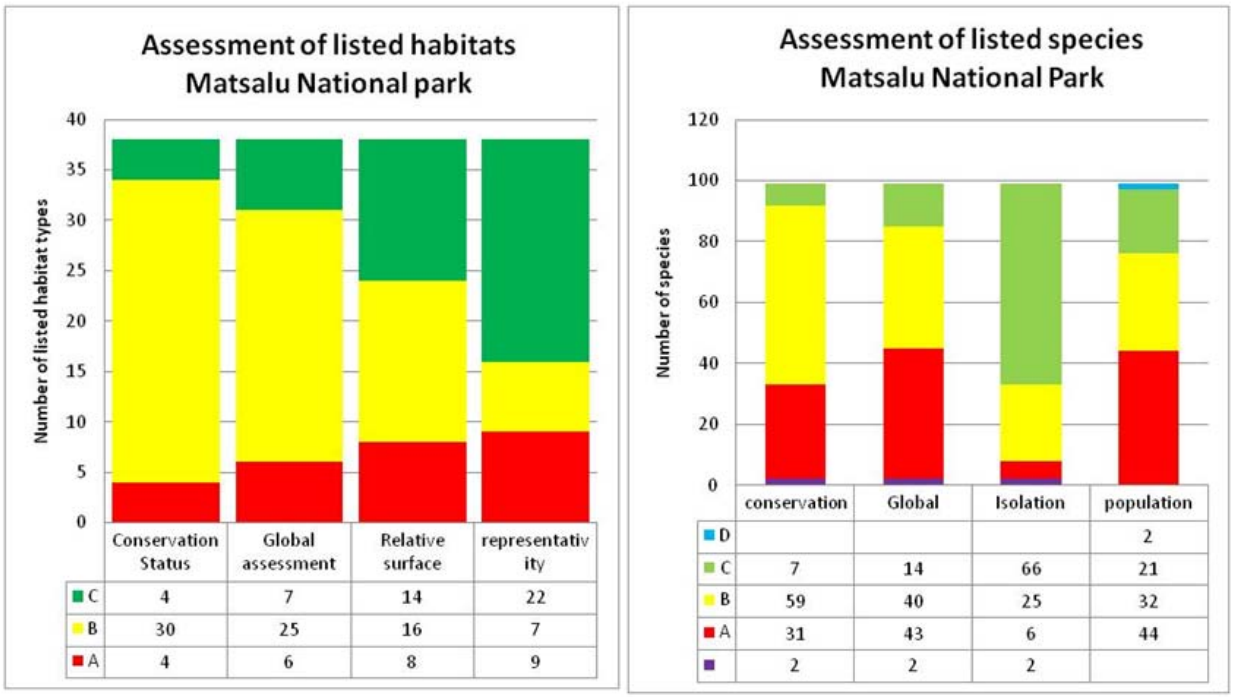


Source: EU CORINE Land Cover Database and EU Natura2000 Database. Deliniation of the parks by Roskilde University.

Matsalu National Park covers an area of 486 km^2, embracing Matsalu Bay and the surrounding land. The park is totally included in two Natura2000-areas: A 2534 km^2 protected area under the habitat directive, extended to the coastal marine area north, south and west of Matsalu Bay, which is again embedded in a slightly larger protected area (2725 km^2) under the Bird directive. 83% of this extended bird protection area consists of marine areas and sea inlets. Dry grasslands, bogs, marshes and fens, heath and scrub covers almost 2/3 of the remaining land area, whereas broadleaved deciduous, coniferous and mixed woodland covers the most of the rest.

38 different listed European habitat types have been registered (14 as priority habitat types), of which the most widespread are related to the coastal zone: Slightly covered sandbanks, boreal Baltic coast meadows, estuaries, alluvial meadows, mudflats and sandflats. The majority of these habitat types are represented by an area of national importance (>2%), for 8 of them even of high national importance (covering >15% of the national area of the habitat type). There conservation status is in almost all cases judged to be good to very good. The global assessment of 31 of the 38 habitat types is that they have a good to very good value.

Figure 3.4: Conservational characteristics of listed habitat types and species in Matsalu National Park. For the ranking system (A,B,C,D), see part 1.3. Where the representativity of a habitat type has been assessed to be of non-significant presence (D), no further assessments have been done (blue colour for no data).



Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping Matsalu National Park.

99 species are listed in the Natura2000 annexes, of which 76 are birds. The presence in the protected area of more than half of these bird species are judged to cover more than 15% of the national population, thus being of high national importance. The conservation status of 86 of the 99 protected species is assessed to be good to very good. For 47 of the 97 estimated species, the Natura2000 area covering Matsalu National Park is globally judged to be of very high importance for the conservation of the species. The population of two bird and two plant species are considered to exist almost isolated within the Natura2000 area related to the Matsalu National Park.

Various negative human impacts are registered, mostly at a low level, but disposal of household waste and drying out/accumulation of organic material seems to be a more widespread problem. A

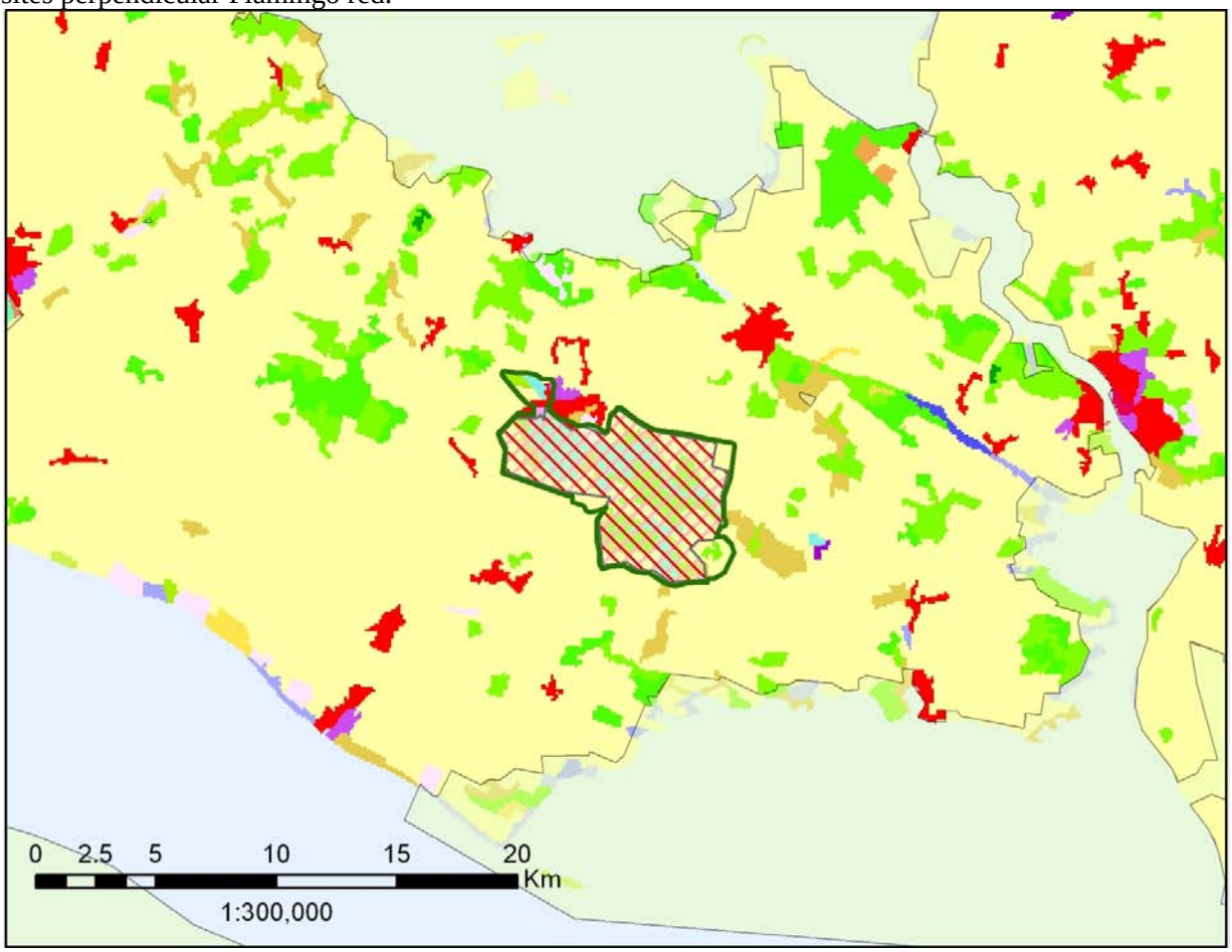
widespread grazing, moving and cutting of grassland are accentuated as an important positive human impact. Professional fishing, hunting and improved access to site are human impacts assessed to be of a low intensity and neutral.

The main carrying capacity conflict areas are the Haeska observation tower, from where more than 100 bird species can be observed, and the glacially formed Salevere grow hill: By Haeska queues arises at the tower, and peoples enters private land to find alternative observation sites, giving man-man conflicts. At Salevere, problems with slippery on the hiking trail make people to go aside the trail. There are also problems with vandalizing youngsters. Other conflicts are related to dust from none-paved roads with many busses, peoples (tourists?) trespassing private land, and dogs attacking visitors.

Visitor monitoring is done by the State Forest Management Centre, whereas the Environmental inspection is responsible for general monitoring.

3.5. Maribo Lakes Nature Park

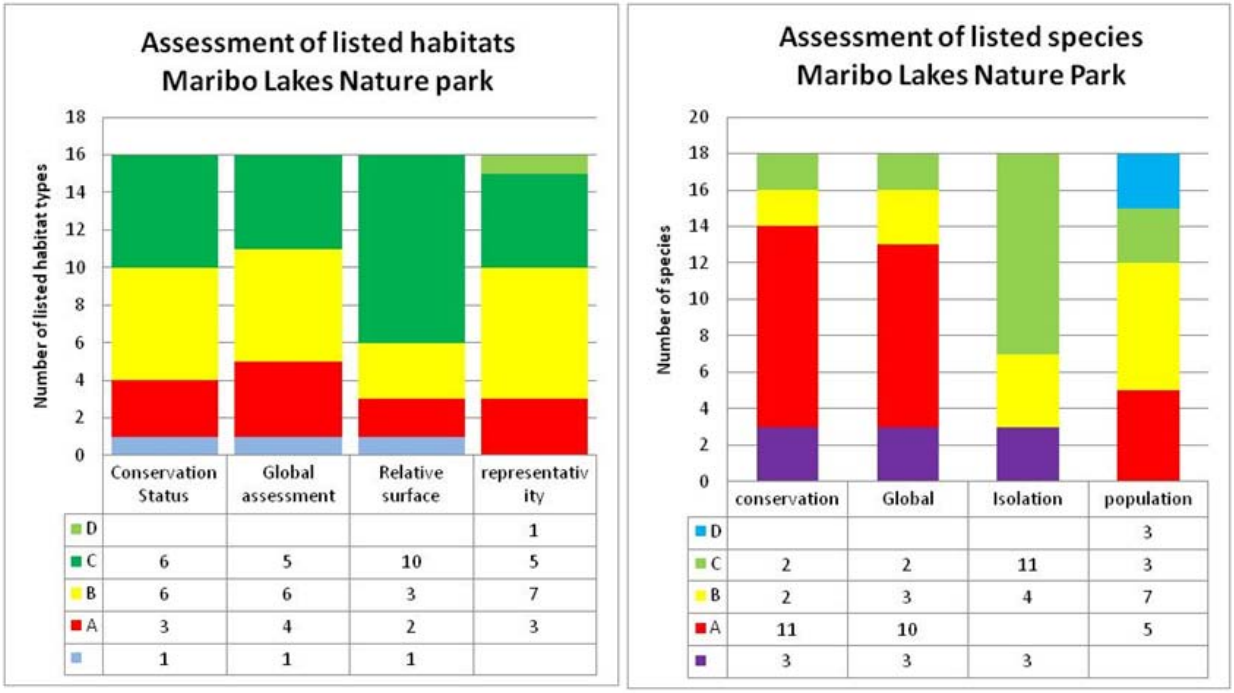
Map 3.5: Natura2000 sites in an around Maribo Lakes Nature Park. For the CORINE legend of the land cover, see Appendix A. All Natura2000 areas in and around the park (delineated with a dark green stroke) have a semitransparent light green overlay. Habitat sites overlapping the park has been dark red shaded, Bird sites perpendicular Flamingo red.



Source: EU CORINE Land Cover Database and EU Natura2000 Database. Deliniation of the parks by Roskilde University.

With a total area of only 47 km^2, Maribo Lakes Nature Park is the smallest of the eight parks within the project Parks&Benefits. About 80% of the park is designated as a 38 km^2 Natura2000-site, both under the bird directive and the habitat directive and totally included in the Nature Park. Almost half of this area is arable land, a quarter broad-leaved deciduous woodland and the rest inland water bodies, mainly shallow lakes with long shorelines and a lot of islands, forming the central part of the park, functioning as breeding grounds for millions of water birds. The town of Maribo is partly situated within the nature park, but outside the Natura2000-area, giving rise to a high degree of recreation use around and near the town.

Figure 3.5: Conservational characteristics of listed habitat types and species in Nature Park Maribo Lakes. For the ranking system (A,B,C,D), see page 4. Where the representativity of a habitat type has been assessed to be of non-significant presence (D), no further assessments have been done (blue colour for no data).



Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping Nature Park Maribo Lakes.

16 listed European habitat types (4 priority habitat types) are covering a large part of the area. Two different lake types as well as the occurrence of alluvial forests and beech forests covers not only more than half of the total Natura2000-site, they have also been assessed as having high representativity and conservation status and at the same time covering a high percentage of the national area of these habitat types.

18 species from the Natura2000-annexes, of which 15 are birds, are covered within the protection area. For all the birds, the conservation status is very good, and since most of the species in the area have a population of national importance, the global assessment is that the value of the Natura2000 site is very high for the conservation of the majority of the species.

No detailed statistical information on impacts and activities in and around the Danish Natura2000sites has been delivered to the EEA-natura2000-database.

The main nature-related carrying capacity-conflicts concerns disturbance of water birds (by fishing, sailing and bird watching), of the eagle nest (protected by a special zoning), and of the meadow flora, incl. orchids (trampling through moped driving and dog walking in the vicinity of Maribo). The disturbance of water fouls have mainly been handled by the development of agreements

between owners and interest groups and later a construction of a game reserve to regulate especially sailing and fishing. In some areas public access has been forbidden or strongly regulated.

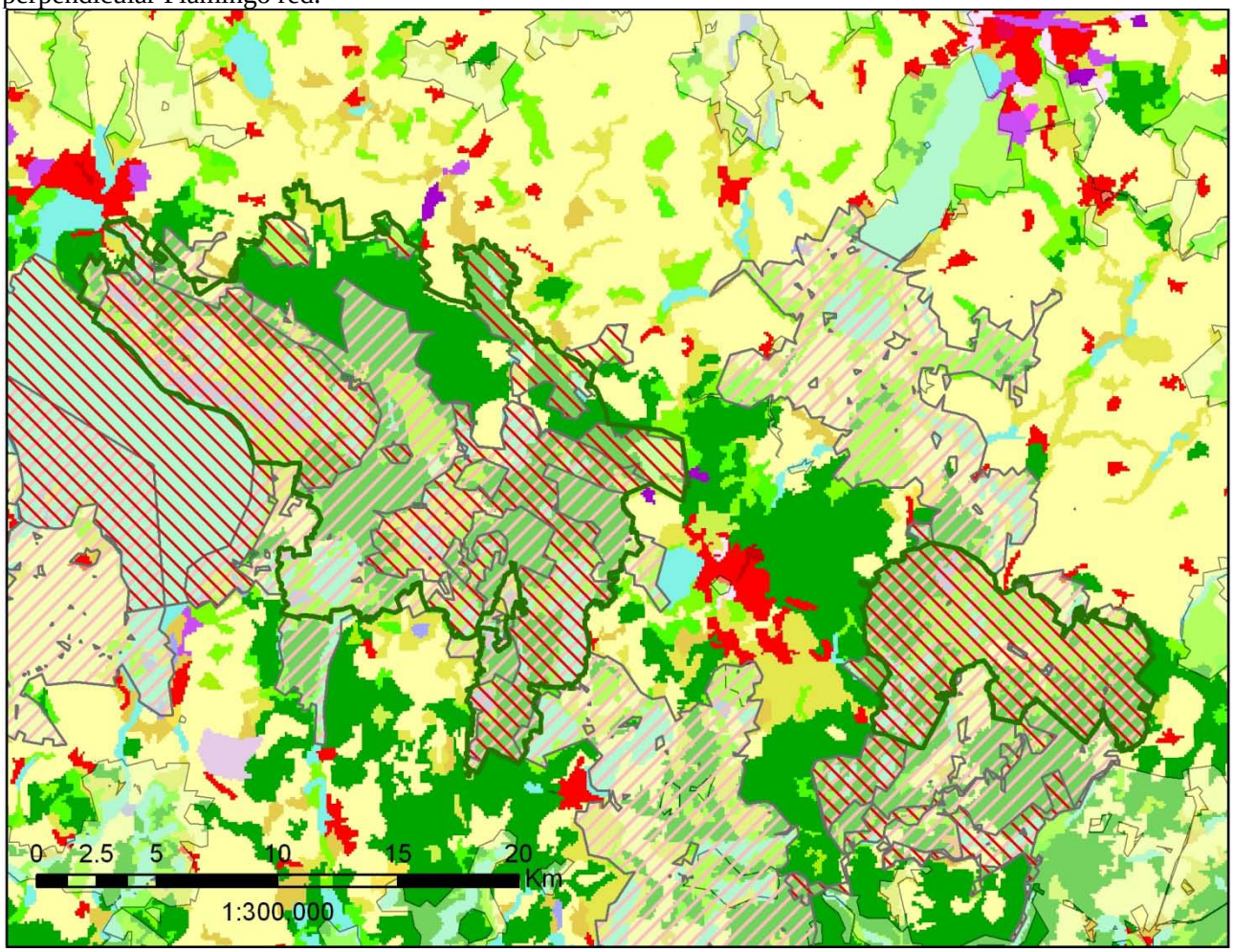
In relation to an expected increase of visitors (e.g. due to the coming tunnel Rødby-Femern (Germany), man-man-conflicts especially around Maribo and in the vicinity of the nature school are to be expected, since here several recreation activities (education, tourist parking, walking, bicycling, fishing and picnic) are located together. In general all over the park the necessary tourist infrastructure (parking places, toilet facilities, waste treatment etc.) will have to develop in capacity and regular management to prevent conflicts.

At least five (potential) local conflict areas, within which regulation of man-nature and/or man-man-conflicts have to be managed, have been localised. Due to the combined use of local attraction areas, e.g. by round-tours in the nature park, local visitor capacity has to be adapted to overall trends in the visitor flow and behaviour, based on systematic monitoring of visitors and their impacts.

A general system of monitoring of visitors that can combine general indicators for the flow of visitors with the monitoring of local tourist pressure and resource impact is under development. No proposals for standards to keep the visitor impact under an acceptable carrying capacity limit have been formulated up to now.

3.6. Müritz National Park

Map 3.6: Natura2000 sites in an around Müritz National Park. For the CORINE legend of the land cover, see Appendix A. All Natura2000 areas in and around the park (delineated with a dark green stroke) have a semitransparent light green overlay. Habitat sites overlapping the park has been dark red shaded, Bird sites perpendicular Flamingo red.



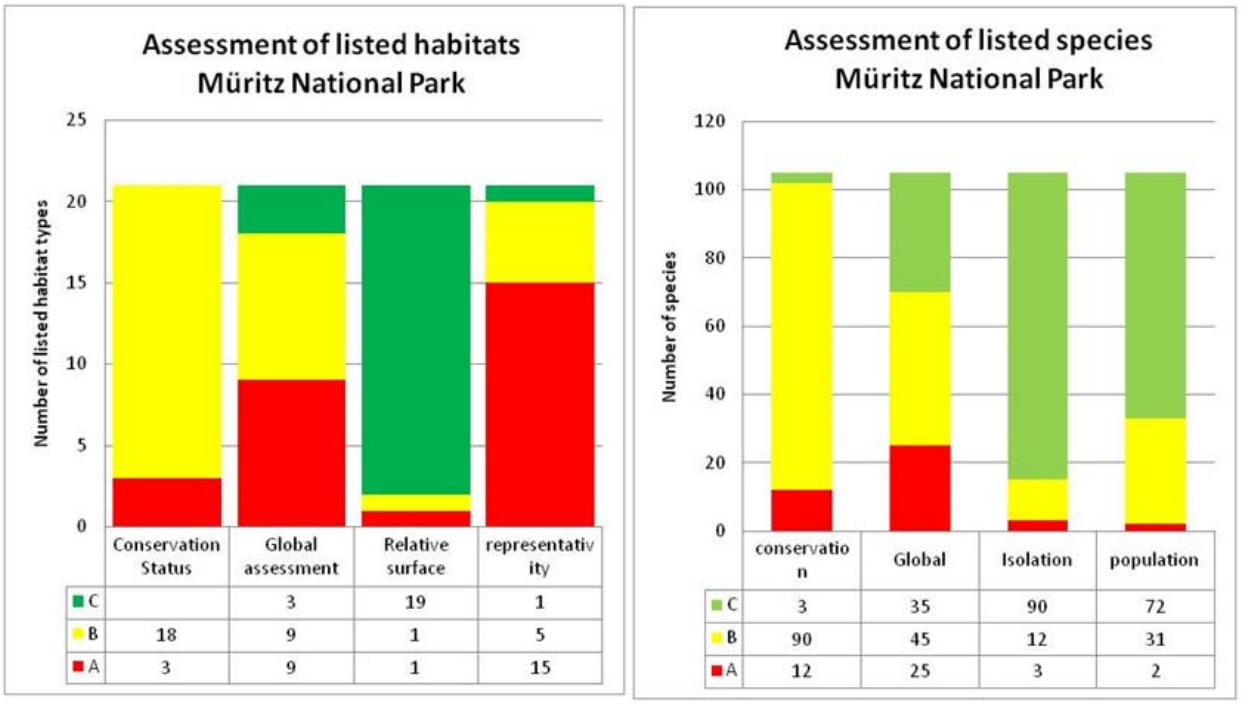
Source: EU CORINE Land Cover Database and EU Natura2000 Database. Deliniation of the parks by Roskilde University.

Most of the park territory is covered by Natura2000 designations. In the western part of the park, designations under the Habitat directive cover Müritzsee and areas along the shore (102 km^2) as well as a good part of the lakes, forests and moores west of lake Müritz (142 km^2), and these areas together with areas outside the park south and west of the habitat areas are incorporated in an extensive area of 458 km^2 under the Bird Directive. Similar, a 64 km^2 designation under the Habitat directive, dominated by coniferous and broad-leaved deciduous woodland and inland water bodies, covers most of the eastern part of the Park. This designation is almost totally included in a widespread Bird directive area of 213 km^2 extending both to the north and south. This results in a

certain inconsistency in using the EU-natura2000-statistic for an assessment of the National Park-related nature resources (especially the species) and the threats against them. However, in a perspective, where the recreational use of the natural values of the Müritz National Park has to be seen in a broader regional perspective, this inclusion of Natura2000 sites extended to nowhere more than 15 km from the official park territory, this inconsistency seems of minor importance.

21 different European habitat types are registered (4 as priority habitat types), with the lake types having the absolutely dominating spatial coverage.

Figure 3.6: Conservational characteristics of listed habitat types and species in Müritz National Park. For the ranking system (A,B,C,D), see part 1.3. Where the representativity of a habitat type has been assessed to be of non-significant presence (D), no further assessments have been done (blue colour for no data).



Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping Müritz National Park.

The representativity of the habitat types is in most cases assessed to be very good, the area however only in one case (calcareous fens with Cladium mariscus and species of the Caricion) judged to cover a high percentage (>15%) of the total national area of this habitat type. For the vast majority of the nature types the conservation status is assessed to be good. The overall assessment of 18 of the 21 habitat types is that they have a good to very good value.

Within the two related Natura2000 areas 97 listed species are registered, 80 of them being birds. The population of 27 of these bird species are judged to be of national importance (covering >2% of the national population), in two cases (Anas clypeata and Netta rufina) even of high national importance (covering >15% of the national population). The global importance of the natura2000 site for conservation of the listed species is assessed to be good to very good for 67 of the 97 listed species.

The human impact is considerable. The most comprehensive and extensive negative human induced impact is general forestry management, but also many recreational activities have a medium impact in large areas such as motorised vehicles, nautical sports, shipping, damage by game species, camping and caravans and leisure fishing. Around Müritz See a widespread eutrophication has a minor impact. However, the impact of paths, tracks, cycling tracks, walking, horse riding and non-motorised vehicles is assessed to be low and neutral and widespread occurrence of hunting, forestry clearance, and grazing in the western part of the park is assessed to have a medium positive impact.

Three areas of carrying capacity related conflicts located in the park have been pointed out by the park administration:

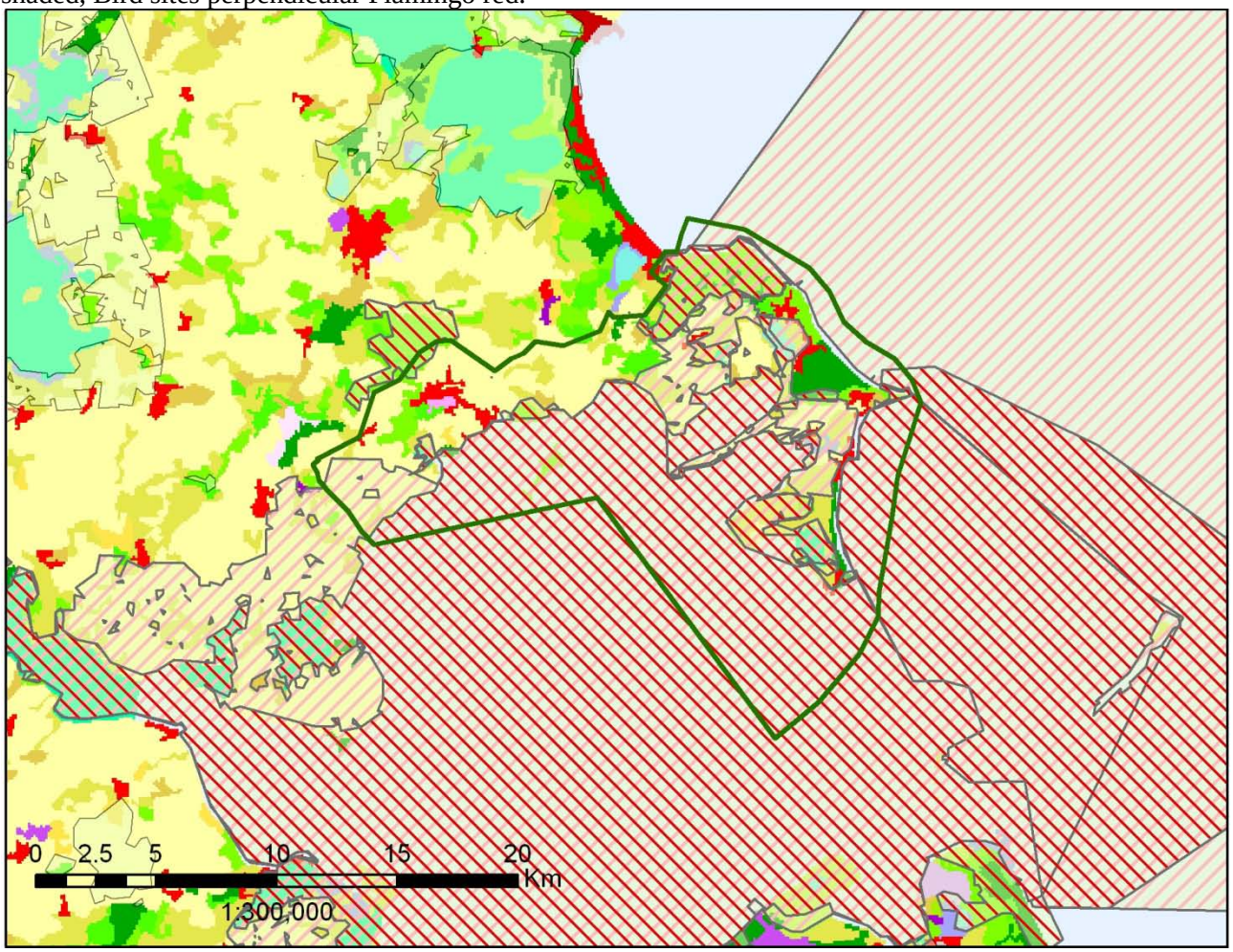
1) The lake Müritz cycle path, visited by max 1.440 visitors pr day in the tourist season especially resulting in conflicts between cyclists and hikers due to the growing popularity of the cycling path also among hikers – feeling disturbed by the cyclists.

2) The resting area for up to 7.000 cranes in the northern part of Rederangsee in the autumn. Due to numerous registrations of visitor disturbance reactions, additionally influencing the experience for the visitors, considerations on visitor group size and clothing, distance between the observance spots and the resting area, time and number of visits etc. was made, and finally a solution was negotiated among the involved partners with the result that individual visits after 4 p.m. was forbidden, and a max. capacity of 160 visitors per evening was decided.

3) The 23 km long canoe route Havel river from Kratzbourg to Zwenzow, parsing through a number of sensible lakes with several rare nesting birds. Especially on the German Bank holidays the frequency of canoes is high. Research on nature science based estimations of a carrying capacity indicates that it might not be possible at all, and additionally not a realistic foundation for a decision on restrictions of the amount of canoes. Instead an expert assessment-process based on the Delphi-method, has been carried out, resulting in a proposal of 180-200 boats per day. This is not far from the actual maximum number of boats per day, which is probably the reason why no carrying capacity-decision on a limitation of boats has been taken up to now.

3.7. Biosphere reserve South-East Rügen

Map 3.7: Natura2000 sites in an around Biosphere reserve South-East Rügen. For the CORINE legend of the land cover, see Appendix A. All Natura2000 areas in and around the park (delineated with a dark green stroke) have a semitransparent light green overlay. Habitat sites overlapping the park has been dark red shaded, Bird sites perpendicular Flamingo red.

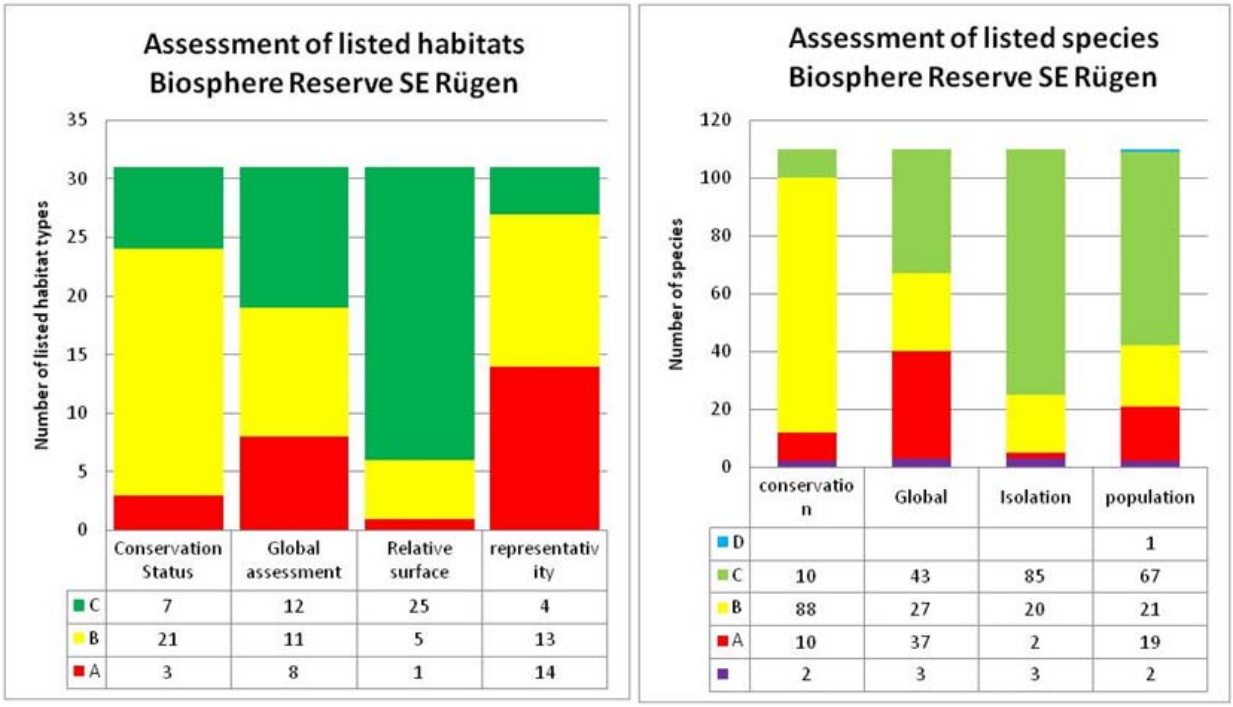


Source: EU CORINE Land Cover Database and EU Natura2000 Database. Deliniation of the parks by Roskilde University.

The vast majority of the territory of the Biosphere reserve South-East Rügen (77%) is designated as Natura2000 areas, either under the bird directive, the habitat directive, or both. However, where almost all marine areas are covered totally, this only goes for a minor part of the land area, of which especially most of the stretch between Kasnevitz and Stresow-Serams, including Putbus, and the area around Ostseebad Sellin, Baabe and Göhren, is not designated as Natura2000. However, both directly and indirectly, the conservational obligations related to the Natura2000 sites have consequences for the land use and recreational potential of the remaining part of the reserve. Beside the dominating conserved marine areas in the park, broad-leaved deciduous and coniferous

woodland takes up most of the natura2000-areas, but many other broad habitat types such as arable land, dry grassland, bogs and marshes, salt marshes and salt pastures and sea cliffs, coastal sand dunes, and beaches, are present as well.

Figure 3.7: 20 Conservational characteristics of listed habitat types and species in Biosphere Reserve South-East Rügen. For the ranking system (A,B,C,D), see part 1.3. Where the representativity of a habitat type has been assessed to be of non-significant presence (D), no further assessments have been done (blue colour for no data).



	Conservation Status	Global assessment	Relative surface	representativity
C	7	12	25	4
B	21	11	5	13
A	3	8	1	14

	conservation	Global	Isolation	population
D				1
C	10	43	85	67
B	88	27	20	21
A	10	37	2	19
	2	3	3	2

Source: Extraction from the EU Natura2000 Database for Natura2000 sites overlapping Biosphere Reserve South-East Rügen.

Within the Natura2000 sites of the Biosphere reserve 31 different European habitat types are registered, with the largest area taken up of two different types of beech forest, large shallow inlets and bays, and coastal lagoons. Except for the occurrence of vegetated sea cliffs, none of these types are assessed to cover more than a few percentage of the national habitat area of the types. The representativity of 27 of the 31 types have been assessed to be good to very good, and their conservation status to be good. In the overall classification of the listed habitat sites in the area, 8 of the 31 habitat sites are assessed to have a very good value, 11 to have a good value.

110 species, of which 92 are birds, are registered as a biodiversity foundation for the designation of the Natura2000 areas related to the Biosphere reserve (of which some areas, especially under the bird directive are located along the coast of the Greifswalder Bodden outside the Biosphere Reserve, however in most cases also expected to have relation to the reserve). For 17 of the bird species, the local population is assessed to cover more than 15% of the national population. The

conservation status of these 17 species are however in only two cases assessed to be very good, but good for the rest of them and for almost all the other species. Two species (the invertebrate Lyceana dispar and the bird Larus melanocephalus) occurs isolated within the area. The overall estimation of the habitats for the conservation are for 34 of the 107 assessed species judged to be very good, for 29 good and for remaining 43 to have a certain value.

A long list of negative human impacts on the Natura2000 sites, mainly related to recreational activities is reported. The most important, with a middle or strong impact on large parts of the area is general modification of hydrographical functioning, water pollution, nautical sports, outdoor sports and leisure activities, removal of dead and dying trees, forestry clearance, general forestry management, shipping, leisure fishing and fixed location fishing. Some important and widespread positive impacts are also registered, especially concerning biocenotic evolution, cultivation and grazing.

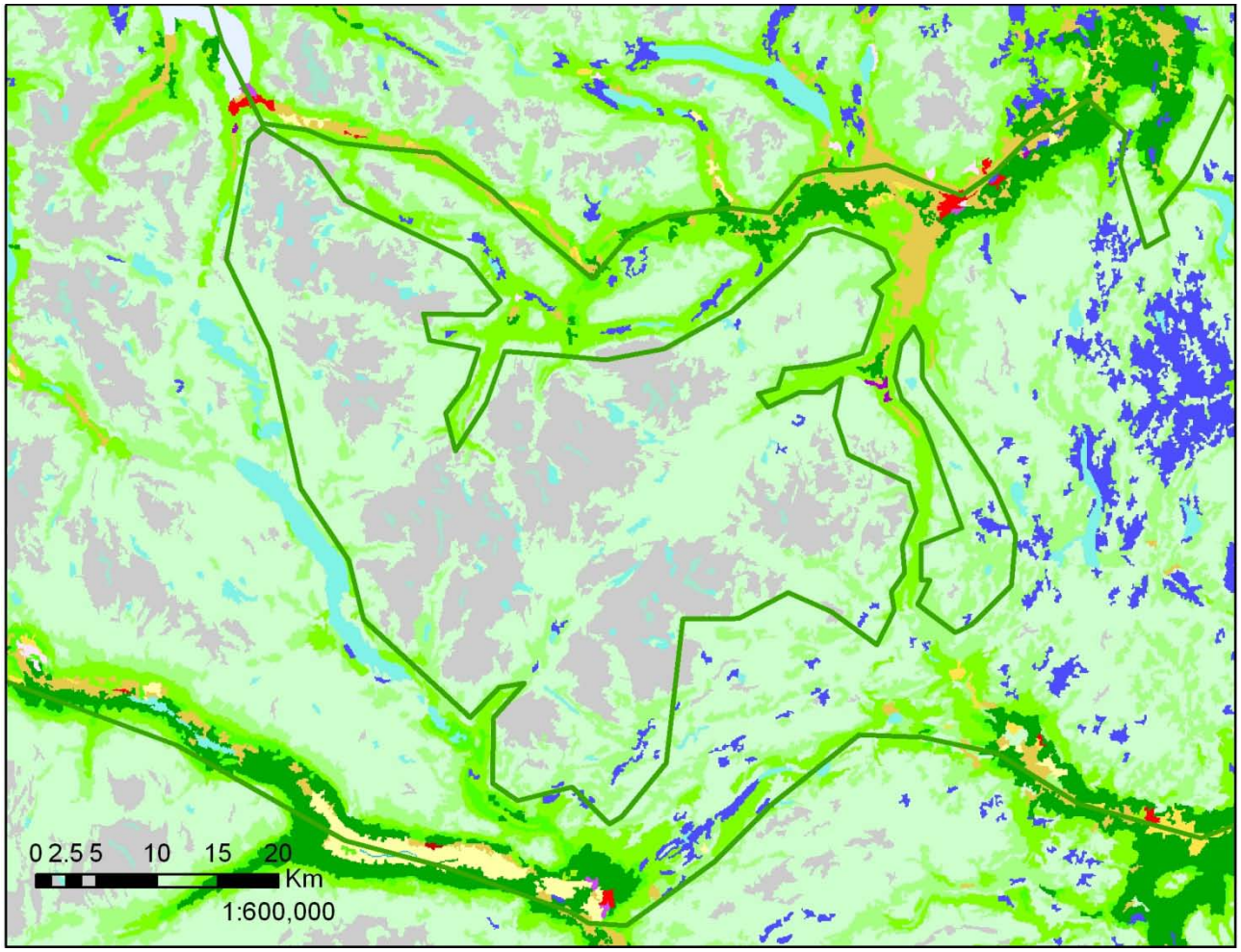
There are signs that a certain man-man related carrying capacity for tourists have already been met in the Biosphere Reserve NE-Rügen, at least for car-based tourist arrivals: with 1,3 mill. Guest-arrivals per year at 64.000 guest-beds, resulting in 7,0 mill. Guest-overnight-stays/year, concentrated in the season June-August, NE-Rügen has by far the largest numbers of visitors of all the parks within the Parks&Benefits project. 74% of the holyday guests arrive with the car, resulting in 25.000 additional cars in the peak season. With only 14.000 parking places at public and attraction places, the deficit results in wild parking and additional search traffic, adding to the widespread traffic jam during the season.

The high, but statistically stagnating car and camper traffic during the last 15 years, indicates the existing capacity problems for car based tourism. However, cyclist traffic has increased considerably during the same period, and increased hiking and cyclist tourism is supported through designations of new paths for the purpose, increasingly extended independently from the existing infrastructural road system.

Despite the enormous flow of visitors compared to the other parks, a well-developed planning tradition of zoning related to the management of local special protected areas within the biosphere reserve gives a number of examples on possible strategies to cope with carrying capacity problems. Restrictions in accessibility or transport-mode (e.g. by ban of private car-traffic, often combined with possibility of special collective transport) can solve many nature-ressource-related conflicts, but at the same time produce certain man-man-conflicts influencing the nature-experience. The main problems related to visitor-induced conflicts seem to be related to water-based access, difficult to manage and control. Indirect human impacts through pollution, changes in water level etc. seems to be more difficult to manage through local zoning.

3.8. Dovrefjell National Park

Map 3.8: Conservation around Dovrefejll National Park. For the CORINE legend of the land cover, see Appendix A. The national park is the two polygons in the middle, delineated with a dark green stroke . Around the park a larger area of related landscape protected areas defines a broader buffer zone, also delineated with a dark green color. The scale of this map is 1:600 000, whereas all the other park-maps are in 1:300 000.



Source: EU CORINE Land Cover Database. Deliniation of the parks by Roskilde University.

The main conservation goal of Dovrefjell National Park is to protect the Dovrefjell area as an (almost intact) mountain ecosystem. Highest priority is given to the conservation of one of the few remaining populations of wild reindeers in Norway. Dovrefjell is however also a cultural landscape, where agriculture and tourism not only has had a substantial influence on land use and land cover of the low-laying valleys, but also on forestry and grazing within the traditional infield-outfield system, as well as on touristic activities in the mountains. The main part of the tourism is based on simple outdoor life without heavy infrastructure.

Nevertheless basic conflicts between the flow of tourists in the mountains and the tracking routes of the wild reindeer exists that has been in focus among the conservation activities during the later years. So, the spatial activities of the wild reindeers are also monitored in and around the park based on InfraRed-scanning with high spatial and time resolution.

Combining these data with spatially relevant monitoring of the tourists can be used to produce indicators for the relationship between tourist and nature that can form a scientific basis for political decisions on the management of carrying capacity of tourism in the area. 9 focus areas have been located, where tourist activities may impair or destroy the conditions for the wild reindeer. However, no final indicators as well as proposals for standards for these indicators have yet been formulated that can serve as background for such decisions.

In 2006 tourist monitoring in Dovrefjell NP was initiated by Dovrefjellrådet (Dovrefjell Council). IR-counters have been installed at different places in the protected area (Kongsvoll, Fokstumyra, Åmotan and one moving around) to register the amount of visitors. Furthermore 24 self-register boxes where visitors are asked to answer a questionnaire are placed at the main entrances and along the main routes. This gives an improved insight into the visitor flow. The monitoring makes it possible to observe if the number of visitors increases or decreases. It makes it possible to compare the movement pattern in different seasons. In additional the questionnaire illuminate factors such as the visitors' nationality, duration of trips, scope of trips, if the visitors are following the marked paths or not etc. The preliminary result is that approx 20.000 persons enter the area at the counting points which may be considered as a very low number for such a huge area.

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Appendix A


Corine land cover classes
1. Artificial surfaces
1.1 Urban fabric
1.1.1. Continuous urban fabric
1.1.2. Discontinuous urban fabric
1.2 Industrial, commercial and transport units
1.2.1. Industrial or commercial units
1.2.2. Road and rail networks and associated land
1.2.3. Port areas
1.2.4. Airports
1.3 Mine, dump and construction sites
1.3.1. Mineral extraction sites
1.3.2. Dump sites
1.3.3. Construction sites
1.4 Artificial, non-agricultural vegetated areas
1.4.1. Green urban areas
1.4.2. Sport and leisure facilities
2. Agricultural areas
2.1 Arable land
2.1.1. Non-irrigated arable land
2.1.2. Permanently irrigated land
2.1.3. Rice fields
2.2 Permanent crops
2.2.1. Vineyards
2.2.2. Fruit trees and berry plantations
2.2.3. Olive groves
2.3 Pastures
2.3.1. Pastures
2.4 Heterogeneous agricultural areas
2.4.1. Annual crops associated with permanent crops
2.4.2. Complex cultivation patterns
2.4.3. Land principally occupied by agriculture
2.4.4. Agro-forestry areas
3. Forest and seminatural areas
3.1 Forests
3.1.1. Broad-leaved forest
3.1.2. Coniferous forest
3.1.3. Mixed forest
3.2 Shrub and/or herbaceous vegetation associations
3.2.1. Natural grassland
3.2.2. Moors and heathland
3.2.3. Sclerophyllous vegetation
3.2.4. Transitional woodland shrub
3.3 Open spaces with little or no vegetation
3.3.1. Beaches, dunes, and sand plains
3.3.2. Bare rock
3.3.3. Sparsely vegetated areas
3.3.4. Burnt areas
3.3.5. Glaciers and perpetual snow
4. Wetlands
4.1 Inland wetlands
4.1.1. Inland marshes
4.1.2. Peat bogs
4.2 Coastal wetlands
4.2.1. Salt marshes
4.2.2. Salines
4.2.3. Intertidal flats
5. Water bodies
5.1 Inland waters
5.1.1. Water courses
5.1.2. Water bodies
5.2 Marine waters
5.2.1. Coastal lagoons
5.2.2. Estuaries
5.2.3. Sea and ocean